

FRIDAY, NOVEMBER 9, 1894.

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#### Contributions.

#### Balanced Locomotives or Heavy Rails?

TO THE EDITOR OF THE RAILROAD GAZETTE:

It has been pretty generally announced in the daily papers of recent date, that a certain large trunk line, noted for its progressive policy, will abandon the use of rails of 85 lbs. per yard as a standard, and adopt a standard of 100 lbs. per yard instead. This is an increase in weight of over 17 per cent. and a corresponding increase in cost. With rails at \$24 per ton this amounts to \$565.68 increased cost per mile of track for rails, not including additional cost of transportation, bandling and labor laying them. If the uncontradicted statements, made in the ing them. If the uncontradicted statements, made in the Railroad Gazette, in reference to the destructive effect of imperfectly balanced locomotives, are correct it appearance that a large part of the strength of a rail is required to resist the force of the driving wheel blows. The writer admits that 100-lb. rails are not too heavy in high speed lines, where imperfectly balanced modern engines are but he reserves the opinion that 80-lb. rails, when balanced engines are used, would give just as good service, and the track could be maintained in good condition for less money. If this view is correct it would appear more economical for a railroad to provide balanced engines for its express service than to expend nearly \$600 per mile on track, for the sole purpose of being able to continue running engines that are mechanically defective. In other words, if a railroad had not perpetuated a mechanical defect in its locomotives it would not now require heavier rails. Would it not be better and more economical now to correct the mechanical defects of the locomotive, as far as necessary, rather than make a large expenditure for the sole purpose of making it possible and convenient to continue and perpetuate a mechanical defect in motive power? HEADLIGHT.

# M. C. B. Coupler Patents.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Very little has been said of late about the patent question in connection with M. C. B. couplers. There seems to be a general feeling among railroad men that any coupler which is offered may be used with impunity as far as patents are concerned. I doubt whether they have not been very lax in this matter. It seems to be true at least that very few of the new devices of the past few years have been passed upon by the Eastern and Western Railway Associations. I have in mind now two large railroad companies which are using and proposing to adopt on royalty two forms of couplers which are each direct infringements of two unimpeachable patents belonging to other parties. Neither of these couplers could find responsible maunfacturers to take hold of them because any examination by a patent attorney at once revealed the fact of these infringements. Yet they have found railroad companies so careless in this matter that they are able to do business with them; and to secure serious consideration of adoption.

Mr. Waitt, in his recent paper before the Western Railway Club, presented some considerations why railroad companies should not design their own couplers or adopt patents and have these couplers made without the inter vention of coupler companies. His argument was good, but he should have mentioned also the question of patent security. There are two strong, valid patents on locks and knuckle-opening devices, which are clearly being infringed by several parties; and there will be some very annoying and expensive litigation if railroad companies are not more cautious in this matter than they have been of late.

#### The Melrose Park Coupler Tests.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Will you kindly answer the following questions: (1) Of what use were the coupler tests that were held

at Melrose Park, near Chicago? (2) Why is it that a public test of this character was not advertised so that railroad men interested in the subject could have had an opportunity to be present? (3) Why are such tests persisted in when so much better information can be had from actual service records which are open to all tailroad men? (4) Was anything learned that we already do not know, i. e., that good malleable iron and good steel are the two materials to be used in drawbars? (5) It looks to me as if the late tests were got up for the purpose of showing up certain makes of couplers and also for the special benefit of certain steel manufacturers. DRAWBAR.

[(1) In our report of the tests, Oct. 26, we said "the objects of the tests aside from the records of actual breakages, were the opportunity for a comparison of the fractures of the different materials and to show the uniformity of the steel of the Chicago Tire & Spring Co., from a large number of different heats." We said also that the couplers were, with certain exceptions specially noted, obtained commercially, and were not made for tests. The possible uses of such tests are many; they were conducted by a well-known firm which could not afford to jockey them, and they doubtless added a great deal to the sum of human knowledge. (2) We do not know. (3) It does not go without saying that "better information can be had from actual service records which are open to all railroad men." For reasons which we have often specified, laboratory tests are more satisfactory than service records, especially in the case of an appliance subject to such complicated conditions as a car coup ler must endure; both are essential; neither is sufficient by itself. (4) Certain makes and designs were compared under like conditions, and the observations made will add to the amount of data by which different couplers may be compared with each other. (5) Yes, you are quite right; the tests were got up for the advantage of certain steel makers, which the man who read the report in the Railroad Gazette knew at the time; that is, we published the news and deceived nobody.—Editor Railroad Gazette.]

# The Relation Between Railroad Legislation and National Prosperity.

BY DON ALEXANDER, Division Freight Agent, C., N. O. & T. P. Ry. II.

The proposition has been advanced that the time has gone by when it is wise, even if practicable, to attempt to influence railroad legislation contrary to the sentiment of the people. Railroads have been vigorously accused of this in the past, and the accusation, echoed from stump to stump by noisy and dangerous demagogues, has done far more harm in exciting hostile public sentiment than could possibly be counteracted by the strongest lobby. It may be that it has seemed in the past, in some cases, more efficacious, because more simple and more direct, to educate elected representatives than to educate their constituencies. Experience appears to have demonstrated the contrary. It is probable that no amount of popular the contrary. It is probable that no amount of popular education will entirely eliminate the boodle-seeking representative from the halls of legislation. But it appears altogether probable that he can be reduced to an innocuous minority, and that he may find himself opposed in legislative councils by a majority who seek only to do justice to the railroads, led by men who are sufficiently informed to point the way to justice.

But this majority and these leaders must come from the people, and must come without pledges of railroad-bait-ing. They must be enabled by the railroads to make their campaigns free from promises to their constituents to "twist the tail of the gigantic railroad octopus." The railroads must themselves be charged with responsibility for creating and conserving such public sentiment as will make unpopular the usual campaign appeals to the socialistic tendency of the masses. The candidates cannot themselves be pioneers in such education. They cannot weight themselves with burdens additional to their bare candidacy. It is asking of them much to remain neutral. The railroads must make their neutrality safe and unadventurous.

This can be accomplished by encouraging the interest of railroad employees in politics. By this is meant not merely shop employees, trainmen and section men, but supervisory officers and employees, whose contact with the managing officers insures concert of action in the direction of honest and intelligent representation, and whose larger compensation and wider responsibilities in-sure loyalty to their employer's interest, such as is not expected because not paid for, and not received because not expected, from the laboring classes. Let these officers see that their subordinates are impressed, first of all, with consciousness of the important fact that in-creased earnings and freedom from legislative harassment for their companies mean for them more secure employ-ment and tetter compensation. The fact is true. The

division Master Mechanic, the Trainmaster, the Roadaster, the Station Agent, know it to be true. With truth on their side, why cannot they so convince their employees, and go with them, not only to the polls, but to the primaries and political campaign clubs, following through every step in the creation and accrediting of a legislative representative? It is needless to say that such a policy is not now pursued. With the exception of the legal department, to which political matters are usually relegated, it will be found that a large percentage of railroad managers discourage political activity on the part of their employees, regarding it as at best a waste of time, and at worst as the source of possible uncomfortable complications. It should be neither. A management that will start in with the cardinal principle that the railroads ask nothing but the suppression of the boodler and demagogue, and the selection of honest and intelligent representatives, and will close the case with the simple sentation of the fact that the interests of the company and of all its employees are, as to public policy, absolutely identical, will find that it has created a political organiza-tion more efficient than any now existing, and has incidentally taken the step which will, more than any other, create and cement the loyalty of the employee to the employer. This is not an untried theory, not an exthe employer. periment. During the past few years of railroad socialism in Texas, the managers were, by stress of unexampled hostility, forced into relations of political dependency on their employees, which evoked instant loyalty, and has been followed by the happiest results.

It is perhaps questionable whether the political in-terests of the railroads would not be better bestowed in the hands of the traffic than of the legal department. The following suggestions occur on this subject: 1. The legal department is more immediately interested in a pure and broad judiciary than in legislation. The judiciary is generally pure and broad, and the entire bar keeps watch and ward over it, generally with efficacy. Since the decision of the Munn case in 94 U. S., the highest appellate courts have so fully reversed that case, and have so clearly declared the fundamental law under which corporate rights claim protection, that there remains little for them to do in the way of constructive adjudication. 2. The public jealously observes and indignantly resents anything which bears the appearance of influencing the judiciary. Legislative corruption is too influencing the judiciary. Legislative corruption is too frequently condoned, but the judiciary is held to the standard of Cæsar's wife. Much public prejudice has been fostered by the interest of railroad attorneys in judicial politics. 3. The legal department of a railroad comes but little into contact with the public. Its profession is a sedentary one. Its pursuits are not publicly active. The traffic department is equipped with a staff of bright, active men, Assistant General Freight Agents, Division, General, Contracting, Soliciting and Local Freight Agents, whose business is to come into the most intimate daily contact with the best class of business men everywhere that the road has business or influence. capital is activity and loyalty, their stock in trade is influence. They are homogeneous, under strict discipline, in constant touch with each other and with their chief. Their necessary qualifications are intelligence, pleasant address and personal magnetism. They have personal daily experience of the results of legislative injustice, and know what needs correcting and usually how to correct it.

The most powerful and most efficient agency of popular education is the newspaper. It is both a creator and a reflector of public opinion. The statement will scarcely be challenged that, apart from questions of partisan politics, the daily press always endeavors to be fair, impartial, judicial and patriotic. Few editors of daily papers can be named who do not prefer to fairly direct and educate public opinion rather than to follow and reflect it. The railroads should put themselves in touch with these men. When editorial or other didactic or controversial publications are made in which the railroad problem is unfairly treated, personal private appeal should be made to the responsible writer, with an analysis of the unfairness, a correct presentation of the issue, and demonstration of its correctness. And the railroads should impress the press with their constant willingness to confer with its representatives at all times, and to candidly present the railroad view of any subject that requires discussion, in advance of publica tion. It is assumed that each railroad has many who can, with truth and justice on their side, and with technical knowledge and accumulated data, which are not available to their opponents, readily refute any views which represent unfair and ignorant hostility. It will be found that the daily press is conducted by men who will gladly welcome such assistance, and that such sugges-tions, frankly, sincerely, and tactfully presented, will bear rich fruit. The daily paper educates the weekly paper, and both educate the people.

paper, and both educate the people.

In all discussions of this matter, in politics, in the editor's sanctum, in the press, on the street corner, the fundamental idea should be that of public education to the fact that "our railroad securities should rank in foreign markets with our government securities," that the railroads are the least sufferer and the public the greatest sufferer by the fact that they do not. The most effective appeals are to self-interest, and the public must be so reached. It must be shown that unfairness to railroad investments is the cause of commercial depression, and that commercial prosperity means simply the enhancement of our national wealth, and that the most simple and most efficient means of enhancement of

national wealth is the appreciation of our American rail-road securities through such legislation as will make them remunerative and safe.

perhaps proper to say a word on the subject of the education of railroad men-an education which is of course indispensably pre-requisite to the education of the public by them through the suggested agencies of the press, the party organization and personal contact. It is to be feared that railroad managements require too little of their subordinate officers and employees in the what may be called general railroad education. Railroad work is necessarily specialized, and there is scarcely a position in any department that cannot be filled by officer or employee with no knowledge of any other de-It is to be doubted, however, whether a tion so filled is perfectly filled, and especially whether any railroad officer or employee in any department does his duty to his company or to himself, who does not endeavor to keep himself in touch with the constant discussion in the technical and news press of the relations between the railroads and the people, and endeavor to equip himself, by special study, to loyally and intelligently present the side of justice to corporate interests as against the assaults of ignorant prejudice and malicious hostility. The special study is not difficult. Technical periodicals are published every week which should be placed before every railroad officer and most employees; in these journals are found references criticisms of standard book publications by specialists in raiload and economic thought that should be purchased and read and digested. Prof. Hadley's work "Railroad Transportation," is itself a liberal education.

There is one requisite for educating public sentiment that is more important than study. It is courage. It is to be feared that we all lack the courage necessary to present and sustain views which have been considered unpopular. Mr. Ripley's remark that "it has been so popular to abuse the tailroads that the other side seldom gets a hearing," means simply that the other side seldom asks a hearing. There is no difficulty in getting one when it is demanded; in fact, it will be found that the road side of the case. If they reply, it will probably be with false logic, with misstatements of fact, with loose argument, and the opportunity for refutation is thereby widened. Courage and knowledge of the facts will win

CHATTANOOGA, Tenn., Oct. 1.

# The Baltimore Ship Canal Project.

The idea of connecting the harbor of Baltimore with the deep water in Delaware Bay by a canal across the peninsula is one of considerable antiquity, as antiquity goes in this new country. In 1807, during the administration of President Jefferson, Secretary Gallatin recommended a ship canal along the Atlantic Coast which should enable war ships to pass from Boston to the Rio Grande through inland waters. Four years later Henry Clay, then Secretary of State, also urged the construction of this inland waterway, but the cost of it seemed too great to be borne by a country so poor as ours was then, and so the scheme slept, to be stirred up from time to time by statesmen, and those who aspired to be thought states

About 1820 certain capitalists united with the idea of building a canal to join the Chesapeake Bay and the Dela-ware River and shorten the water route between Baltimore and Philadelphia. A company was formed soon afterward, and preliminary work begun. The work was undertaken in 1824 and finished in 1829, the water being let into the canal on July 4 of that year. The total cost was \$2,200,000, one-fifth of which was paid by the United States Government, \$100,000 by the State of Pennsylvania, \$50,000 by the State of Maryland, \$25,000 by the State of Delaware and the balance by private citizens of the three States.

This canal, known as the Chesapeake and Delaware Canal, is about 16 miles long, 66 tt, wide at the water line, 36 ft. on the bottom, with an average depth of 10 ft. of water, the depth of excavation at the summit being 75 ft. It has three locks, a tidal lock on the Chesapeake side, a lift lock of 16 ft. on the Maryland side and another one of 16 ft. on the Delaware side. The summit level, 10 miles long, is supplied by pumping water out of Back Creek at an expense of \$12,000 a year. The cost of maintenance is \$50,000 annually, and profits have been generous throughout the entire history of the canal. It affords a direct waterway between Baltimore and Philaaffords a direct waterway between Baltimore and Phila-delphia, and has been of great utility in the commerce between the two cities. As an outlet, however, from the port of Baltimore to the ocean this canal would be of small service. It would leave ships at Delaware City on the Delaware River, more than 100 miles from the sea, and the passage from Baltimore to a point 12 miles beyond the Delaware Breakwater by this route would save less than 10 hours from the trip around the capes, besides winding through tortuous and dangerous channels along the shoals of the Chesapeake and the course of Elk

In 1872 the project of building a larger ship canal across the peuinsula, which would accommodate ocean vessels, acquired enough momentum to cause the formation of a company. It was incorporated under the laws of Maryland, and the Delaware Legislature also granted the company a charter to construct a ship canal upon what is known as the "Sassafras" route, and in 1874 a survey and estimates were made by the late B. H. Latrobe,

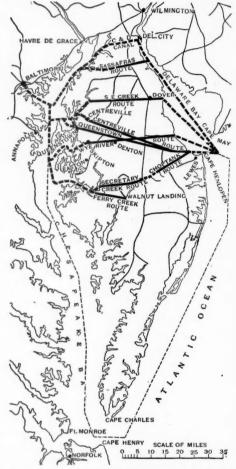
chief engineer of the company. In 1878 surveys were commenced by the engineers of the United States Gov-ernment, the results of their work being embodied in everal reports to Congress prior to 1882. The surveyed outes were six in number, extending from the Chop-The surveyed tank River on the south to the Sassafras River on the north. The following table and explanatory note give the principal results of the several surveys:

Route,	Length of Route.	Max. Depth.	Cost.	Time of Transit	Saving in Time.	Saving in Dis- tance.
				Hours.	Hours.	Miles.
Sassafras	129.25 115.78	16.20 38.35	\$8,000,000 25,000,000	18.10	18.10 17.50	195.75 209.25
S. E. Creek Centreville	106.38	50.95	41,500,000	16.50	16.75	219.00
Oueenstown.	107.29	53.78	37,250,000	17.00	16.25	217.75
Wye River		42.99	26,334,000	17.75	15.50	196.50
Choptank	149.80	37.67	16,500,000	19.50	13.75	175 00

Note—These estimates are based on a canal prism 100 feet wide at bottom and 26 feet deep below mean low water line, with a width of 178 feet at the water level. Thirty feet above bottom a berme 12 feet wide is provided for, and all slopes are 1½ to 1. Locks where needed to control currents and flow of tide would be 60 by 600 feet in the chambers, and designed to pass vessels drawing 23 feet. Time estimates are calculated on the theory that steam vessels can sail 10 miles an hour in open water, 7 miles in dredged channels, and 5 miles in the canal proper.

The company chose the Sassafras route. This route recognitives the sailing of skips from the mouth of the

necessitates the sailing of ships from the mouth of the



Surveyed Routes for a Chesapeake and Delaware Ship Canal.

Patapsco, across Chesapeake Bay, 40 miles, to the mouth of the Sassafras River. Utilizing the course of this stream to the head of tide-water, 16% miles, the canal would traverse a country rising 70 ft. above low water, over the divide, and down to the drainage of Blackbird Creek. Following that stream to a high ridge which deflects the creek sharply to the north, by a short cut through this impediment, it would reach Delaware Bay near Liston's Point, 46 miles above Lewes, Delaware. The canal proper would be 16 miles long, and two tide locks would quired. The chief advantages of this route are the short cut through Delawaie, moderate cost of construction and ease of maintenance. Its disadvantages consist of the long passage over the waters of the Chesapeake and Dela-ware Bays in approaching and leaving the canal necessitating extensive dredging. The length of this route from Baltimore to a point 12 miles beyond the Delaware Breakwater is 129 miles, which saves only 195 miles from the passage around the capes, and the trip would take but

What is known as the Queenstown route in the preliminary surveys above referred to and shown on the accompanying sketch map is thought by many to be the ideal line. This route would require vessels to leave the Chesapeake at the mouth of the Chester River, to pass up that river and Queenstown Creek to Queenstown, whence a channel must be constructed from 60 to 80 ft, deep, passing in an air line to Broadkill Creek, 2¼ miles above its mouth at Wiltbank's Landing. Thence the line would pass direct to the Delaware Bay, three miles above Lewes. This line lies nearest to a straight course from Baltimore eastward across the peninsula. It would require an excavation of 53 miles in length, costing \$37,000,000; it would consume 17 hours in passage of ships from Baltimore to the ocean,

and would save 16 hours and 218 miles over the trip around the capes, while the cost of maintaining the canal after it is built would, it is supposed, be less than

upon any of the other courses.

The competing lines, however, are the Sassafras and the Choptank routes; the latter decidedly the more popular with the Baltimore interests, which naturally prefer a free canal built and maintained by the general govern-ment to one in the control of a private company. The terminations of the Choptank route in the Chesapeake

nd Delaware bays are the more accessible.

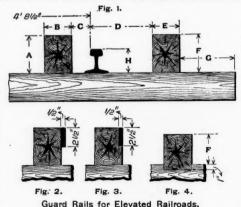
The selection of a route is now in the hands of a very competent board of military, uaval and civil engineers, whose decision will probably be final. The act of Congress under which this board is appointed introduces a new element into the consideration of the problem, which is no longer one of purely commercial and civil engineering principles. It must also be strategical. Upon the effect which this condition will have in the selection of a route we will not speculate, but await with interest the action of the board.

The port of Baltimore has been able to control a large oreign trade, owing to its good railroad communications and terminals. The Patapsco River, now made available and terminals. for deep draft ocean ships, affords a first-class harbor. If competition at Charleston, Savannah and Norfolk were out of the way there would be no cause for anxiety, but Norfolk and Newport News are as near the great centers of production and distribution as Baltimore, while they are 175 miles nearer the sea. Savannah and Charleston, in like manner, are equally adjacent to the corn and cotton fields, to the mines and lumber forests of the interior. The passage from Baltimore around the capes to the ocean is reckoned as 334 miles, and it will be only a question of time when these points to the southward will have facilities for commanding inland business equal to those of Baltimore and some of them better ones; and when that time comes the cost of transportation up and down the Chesapeake will be an important element in the problem of foreign trade.

#### Guard Rails; Elevated Railroads.

An elevated railroad is essentially a long bridge, with the distinction, when the proper location of guard rails is under consideration, that in elevated railroad construction the form and position of the guard rails at approaches, a disputed question in bridge construction, need not be considered. Making such exception, the axioms laid down for the location of guard rails on bridges apply on elevated railroads. Accompanying this are a table and illustrations, showing the relative positions and dimensions of frack rails and guard rails on seven New York elevated structures and three Chicago elevated roads which indicate to what extent accepted principles, which seem general enough to be termed axioms, have been followed in lo-cating guard rails of elevated railroads.

The inside guard rail is preferable and should present a metal surface to the wheel, in case of derailment; this permits of a metal guard rail, or one of wood faced with metal. It will be observed from the illustrations and metal. It will be observed from the illustrations and table that all the elevated roads use both an inside and outside guard rail, but that the position of the guard rail relatively to the track rail is such, in each design, that the wheels of a derailed truck would come in contact with the inner guard rail first. The guard rails are of wood; five of the seven New York roads have a strip of iron on the upper outside edge of the inner guard rail; the remaining two New York roads and the three Chicago roads have guard rails of wood unprotected. The above bears us out in the position that has been taken by us that the guard rail should act on the inner wheels of a detailed truck so as to tend to swing the axle into a position parallel with the ties The action would be the reverse if the derailed wheel first struck an obstacle



side of the track; the axles would be turned to a position

more or less nearly parallel with the rails. The reason that the guard rail should be of metal instead of wood is that the wheels could not bite into it. The nearer the guard rails are to the track rails the less chance, in case of a derailment, will there be of the wheel biting into the guard rail, and the less need, might say, for the wood to be protected by metal. table shows that, except in one case, the unprotected guard rails are placed at a greater distance from the track rail than are the protected ones. The most pronounced case is that of the Lake Street Elevated. Another strong argument why the guard rail should be placed as near as

possible to the track rail is that a derailed truck will be more nearly in line with the rails, therefore lessening the possibility of a more serious

The ventilation is now good and in those tubes on which the work has been completed, the opening pro-vides pleuty of light for the workmen. It will be observed that the track rails are laid on stringers, the latter resting

	A	В	C	D	E	F	G	н	Weight of Rail.	Cross Tie.	Remarks.
Second Ave., New York	8"	6"	41/4"	534"	6"	8"	8"	41/4"	65 lbs	6" × 6" × 8' Every third tie is 6" × 6" × 12'	Iron on inner guard, fig. 2.
Third Ave., " "	8" 8"	5" 6" 5"	4" 23/4" 4"	6" 5"	5" 6" 5"	10" 8" 10"	834" 834" 834"	31/8"	90 "	5" × 6" × 8' 6" × 6" × 8' 5" × 6" × 8'	Iron on inner guard, fig. 2.
South Fifth Ave.	8"	6"	23/4"	514"	6" 7"	8" 7"	131/2"	31/6" 4"	90 "	6" × 6" × 8' 6" × 6½" × 8'	Iron on inner guard, fig. 3. Inner guard, fig. 3; cuter, fig
lifty-third Street "	8"	6"	4"	53/4"	6" 6"	31/2"	234"	5"	90 " 90 " 80 1bs)	6" × 6" × 8' 6" × 8" × 8'	Iron on inner guard rail, fig.
ake Street, Chicago	6"	6"	6"	111/4"	6"	8"	21/9"	414"	76 "	$6'' \times 8'' \times 8'$	*
Metropolitan, Chicago	8"	6"	4"	93/4"	6"	8"	43/2"	5"	80 lbs	6" × 8" × 8'	

The "Alley" Elevated of Chicago and six of the New York roads are laid with 90-lb. rails; the New York roads were laid orginally with from 50 to 65-lb. rails, but Mr. R. I. Sloan, who was then Chief Engineer of the Manhattan, recommended a 90-lb, rail, and, except ing on the Second avenue line, which was then new and laid with 65-lb. rails, the different lines were relaid with the heavier section. During construction of the "Alley," and for some time after, Mr. Sloan was Chief Engineer of that road, and to him is due the fact that the road is laid with the heavy section.

#### Certain Changes in the Victoria Bridge.

Ventilation.—As all the world knows the Victoria Bridge carrying the Grand Trunk Railroad over the St. Lawrence River at Montreal is a long tubular structure, which as originally built and as operated for many years, have no provision for ventilation. A number of years, ago it was decided to cut out portions of the top plates to admit light and to allow smoke and gases to escape. Some five year ago we described briefly what had then been done are now able to give a further account of the work

The engraving which shows a cross section of the bridge

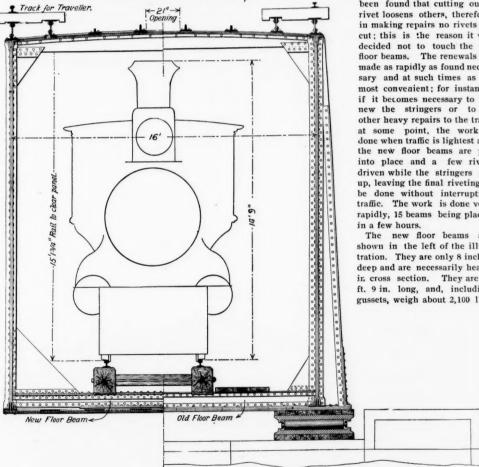
directly on the floor beams, and, excepting the neces sary tie-rods and spacers, there are no crossties. This construction was necessary in order to facilitate the removal of cinders, ashes and other material that accumulates between the rails to an extent greater than would be supposed. Until the opening was made in the roof, the removal of the accumulations, and repairs inside the bridge, were accomplished with difficulty on account of the offensive gases from the passing locomotives; now, however, no inconvenience is experienced from this

Floor Beams,-It has also been found necessary to renew the floor beams; chiefly because of the increased rolling loads since the bridge was constructed, and from the fact that age and use, especially the droppings from refrigerator cars, have caused oxidation.

The old floor beams are 7 feet apart and, besides a gusset plate to each side of the tube, are riveted to the floor. The method of strengthening the bridge is to place new beams between the old ones. The new beams are secured only to the sides of the tube, but the gusset plates are heavier than the old ones. The new floor beams are not so deep as the old ones, because the former are made clear the rivet heads on the floor of the tubes. It has

been found that cutting out a rivet loosens others, therefore, in making repairs no rivets are cut; this is the reason it w decided not to touch the old floor beams. The renewals are made as rapidly as found neces sary and at such times as are convenient; for instances if it becomes necessary to renew the stringers or other heavy repairs to the track at some point, the work is done when traffic is lightest and the new floor beams are into place and a few r few rivet, driven while the stringers are up, leaving the final riveting to be done without interrupting traffic. The work is done very rapidly, 15 beams being placed in a few hours.

shown in the left of the illustration. They are only 8 inches deep and are necessarily heavy in cross section. They are 15 ft. 9 in. long, and, including gussets, weigh about 2,100 lbs



Changes in the Victoria Bridge-Montreal

method of strengthening the bridge to compensate for the material cut out.

The opening is 21 inches wide and is on the center line of the bridge, but is not directly over the stack of a loco-motive, because the center line of the track is not the center of the bridge; room is left at one side of the track for a foot passage. Before cutting the tubes for the open-ing, additional T beams, shown t the upper corners under the track for the traveler, were added, to compensate for the removal of the center section. It is cal-culated, also, that the material added is sufficient, in area and position, to increase considerably the strength of the bridge. With the exception of two spans, which it is expected will be completed next year, and the center span, which is left now because there is already ventilation at either end of it, the work is now pleted.

shows the position of the opening in the cover and the | They are calculated to take the entire weight of the rolling load and to relieve entirely the old floor beams. There will be required altogether 656 beams for renewals, and of this number there will remain at the end of this year 426 to be put in place. We are indebted to Mr. E. P. Hannaford, Chief Engi-

neer of the Grand Trunk, for the facts and data contained The work is being done under his general supervision.

# A Minimum Gage Railroad.

I had a chance the other day of making a trip to Derby in order to see a short line of railroad, built and worked with iolling stock of a strictly practical type, on a gage of 15 inches, and I had to confess that there wasn't a main line system in Great Britain and Ireland (not to mention other countries) whose officials might not with

advantage make a study of some of the "wrinkles" to be seen on this line

The owner of this little model line is Mr. A. Percival Heywood, of Duffield Bank, near Derby, a town where, as your readers will probably know, the Midland Railway has its locomotive works and general headquarters. gentleman made up his mind many years ago to build a short line, which would show the minimum width of track possessing the necessary stability for practical use; and in making a final choice he seems to have gone one better than Decauville, who fixed on a gage of 16 inches. Of course the idea with both was not necessarily to advocate such lines for general and indiscriminate use, but rather to show the great capabilities even of so narrow a gage, and consequently the still greater resources of more

Descriptions of the line at Duffield have already been given in the papers, not only now but some years ago when Mr. Heywood invited the members of scientific sociations to visit his place; so I will only touch upon the main points.

It is entirely a private line, running up a steep hill on a grade of 1 in 10 for about ¼ mile to a level on the hill side where it is laid out somewhat in figure-of-eight fashion for a length of about a mile. The rails are of various sections, 12, 14, 18 and 22 lbs. per yard, laid partly on wooden ties, 6½"x2½"x3ft., but with cast iron ties, weighing 28 lbs. each, over most of the line. The latter have worn admirably, even with weights of 20 cwt. per axle. Mr. Heywood lays great stress upon using long sleepers. These ought, he thinks, to project outside the rail to a distance of rather more than half the gage. There are on the line three tunnels, two bridges and a timber trestle 90 ft. long and about 20 ft. high. The latter is built of pitch pine and serves as a capital model of what might be done for military or transport requirements. It was put up by four men in three days without any scaffolding; the loadway is carried on four timbers, 11"x3", bolted together in pairs, and breaking joint at alternate trestles. The latter are simple A trestles with cross bracing equal to half the height. The entire cost of the bridge was \$150, or say \$5 a yard, and to show the expense of "frills," it may be mentioned that a platform with hand rails was afterwards added at an exactly equal outlay. The chief points of interest, however, lie in the rolling

stock. For wagons to carry goods or freight, ordinary 4-wheeled wooden box cars are used, weighing about 5 cwt. each, and carrying from 20 to 30 cwt. These measure say 5 ft.x2 ft. 6 in. inside, and Mr. Hewyood considers that the floor area of narrow gage wagons should within the limits of ample stability,—be four times the gage in length, by twice the gage in width. This rule is followed pretty largely and the passenger cars therefore become quite substantial structures. Some of them are open, 19 ft. 6 long by 3 ft. wide; on two bogies of 18" wheel base. A foot brake is fitted to one bogie on each of these cars. which weigh only 20 cwt, yet seat 16 people, two abreast. The weight is therefore 11/4 cwt. per passen-Closed cars are also employed, and although to stoop slightly to get in, yet when once seated there is ample room: and speaking personally I have many a time travelled on a main line in far less commodious carriages. I don't say anything about the dining or sleeping cars (though they are provided) because I didn't amine the interiors very closely. The Bishop of Dakota
—I was told—much appreciated the sleeping berths on a recent visit because they are 6 ft. long, and therefore gave him 3 inches margin lengthwise, which is more than the Pullmans do, to the consequent sticking out of his toes and tripping up of passengers.

The locomotives at work on the line are the most handy and well finished little engines that I ever saw, and will give points and a beating to any which might be taken from the show rooms of the small engine manufacturers. One of them is a six-coupled outside cylinder engine with 14-inch drivers, 5"x7" cylinders, 4 ft. 6 wheel base, plain cylindrical boiler, 6 ft. 6 in. long, 25 inches diameter, with 57 tubes 1¾" diameter; heating surface, order, 3 tons, 6 cwt., working pressure, 160 lbs. per sq. in. The tractive force per lb. pressure in the cylinders is given as 13.5 lbs., and the net load it will draw on the level 38 tons. Some of the curves on the line are as sharp as 25 ft. radius, and the special features of this locomotive consist of devices to meet such curves without using bogies. In the arrangement adopted the whole of the weight is available for adhesion, and there are no This has implied the abolition of a hanging fire box, but the launch type of boiler serves admirably. The wheels are not fixed upon the axles, but each pair is keyed upon a cast iron sleeve through which the axle passes. The sleeve upon the middle axle can slide in. in either direction, laterally along the axle, which is carried in two end bearings, but cannot revolve upon the axle. The leading and trailing axles are also mounted on sleeves with a connection to each axle by means of a ball joint at the center so made as to let the sleeve radiate in any direction whilst revolving with the axle. The middle sleeve is so connected with the leading and trailing sleeves that when the former makes a lateral diversion the two latter are radiated precisely to the required curve, provided it is within the limit of travel of the middle sleeve, which is arranged for a curve of 25 ft. radius. This system has worked capitally for the past 13 years, and not the trouble has been experienced in the way of special or extra repairs.

Eleven miles an hour is reached easily with these engines, although a speed of over 23 has been attained. The last one built—just now put on the road—has eight wheels coupled, and is designed on much the same plan as the six-wheel above described. Both steam and hand brakes are fitted, and a valve gear somewhat on the Joy pattern is used. These engines—as well as the rolling stock, and almost everything in short connected with the line—have been made in Mr. Heywood's work shops, where Mr. Heywood himself, with his sons and several workmen, find pleasure in turning out work that would do credit to any big firm of ergine builders or carriage makers. His main object now in drawing the attention of engineers and railway men to what he has done, is to help create a feeling in favor of light narrow gage railways of cheap yet good construction for the development of agriculture and other essentially home industries. Based on figures which experience has given, his opinion is that freight haulage on such a system might bet 30 per cent. at leas cheaper than the use of horses and carts in the orthodox

I should strongly recommend any railroad men from the United States who may be visiting in this country to write Mr. Heywood and ask his permission to view the line and rolling stock. They are both well worth travelling some distance to see. F. B. I.

LONDON, Sept. 11, 1894.

#### Long Valve Travel and Negative Lap.

On the editorial pages of the Railroad Gazette of Aug On the contorial pages of the *Kaitroda Gazette* of Aug. 10, 1894, there were given some general remarks on the subject of negative lap or inside clearance, together with references to some experiments made by Mr. Robert Quayle, Master Mechanic of the Chicago & North-Western Railway, at Kaukauna, Wis. A number of indicator cards were also given showing the effect of negative lap at various speeds, and illustrating the conclusions reached

We are now enabled, through the courtesy of Mr. J. H.

from an inspection of those of Group 2 from engine No. 836 with 6½ in. valve travel and valves line and line inside, that the improvement shown is due principally to the increase in valve travel. This is probably the case as the amount of negative lap is too small to make a very great difference in the distribution or economy of the locomotive.

The present arrangement of engine No. 836 is giving very good satisfaction, Mr. McConnell reporting a saving in fuel of 20 per cent, over the engines with short valve travel and no negative lap.

DATA FROM INDICATOR DIAGRAMS, UNION PACIFIC SYSTEM.

No. of Card.	Engine No.	Valve Travel.	Outside Lap.	Negative Lap.	Speed in Miles per Hour.	Boiler Pressure,	Initial Pressure.	Cut-off.	Mean Effective Pressure.	Indicated Horse-power (One Side).	Throttle Open-
1	844	51/4	3/8	0	iż	175 175	140	221/8	120 77.6 40.8 39 90.4 52 56 46.4		in. 3/8 3/4 594 11/8
1 2 3 4 5	46	6.5	65	66	15	175	150	221/8 153/4 89/8 95/8 185/8 63/4 5 21118 13 61/8	77.6	189.1	34
4	4.6	6.6	66	46	52.9 60 10 46 41	180 175	160 155 120 157 158 160 135 145	898	40.8	350.6 380.6	84
5	836	61/2	11/4	0	10	130	120	1954	90 4	145.5	1/8
6	46	11	11	6.0	46	175	157	8	52	386.8	1
6 7 8 9	44	46	6.6	66	41	130 175 175 175	158	63/	56	371.3	11/4
8	6.6	46	6.6	64	53.4	175	160	5	46 4	400	1
9	836	61/2	11/4	83	Start	155	135	2111	126.3	100	
10	6.6	4.6	64	6.6	6	155 175	145	13	126.3 99	93.5	9
11	6.6	66	6.6	6.5	45	180	155	513	40	93.5 292.4	32
12	4.6	64	66	54	60	180	157	613	40 43	419.6	1/4 93/8 113 113

#### The Central Club.

At the October meeting of the Central Railway Club (Buffalo) the following subjects, among others, were dis-

CAR DOOR HANGERS, ETC.

Mr. McIlwain from the committee on car door hangers, fastenings, hinges, brackets, practical results from common devices, etc., presented the following report:

We only undertake to give you at this time a brief

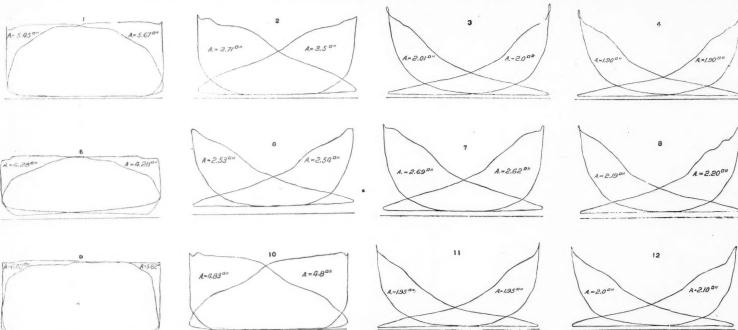
the Tring head consisting of spider follower, Tring and two cast iron packing rings securely bolted together with 6-in. follower bolts. In 1891 they were persuaded to use the solid piston as it was claimed to be superior in every way to the Tring. After three years' trial they are perfectly satisfied to do away with the solid piston. They had 35 engines equipped with the solid piston and are now removing them as fast as possible, and will have the solid pistons removed from all engines before the close of this year.

The practice in fitting solid heads was to turn heads \$\frac{1}{3}\$ in. smaller than cylinder; the packing ring grooves \$\frac{1}{3}\$ in. wide, \$\frac{1}{3}\$ in. deep; rings \$\frac{1}{3}\$ in. square with \$\frac{1}{3}\$ in. spring. After one year's wear these heads were usually found to be worn off \$\frac{1}{3}\$ in. several instances pacing rings were found worn on top to \$\frac{1}{3}\$ in. thickness. This peculiar wear is attributed to steam getting under packing rings after bottom of head became worn so that rings filled the grooves nearly one-half the diameter of the head on the bottom, which permitted an opening of \$\frac{1}{3}\$ in. on ore under rings on top of head, allowing considerable space for steam to expand in, thus causing rings to wear as described.

A further trouble with the solid head was found that when the bottom of piston head and cylinder became worn the cross head becomes out of true rising from guides at back end, and if guides are closed as they should be to prevent peunding, cross head will show excessive wear on top of back end, and bottom of front end; the piston rod also receiving undue strain from this cause.

The comparative first cost of pistons is about 50 per cent. in favor of the solid head. However, the frequent renewals and reboring of cylinders will soon place the balance in favor of the \$\frac{1}{1}\$ in. thick to \$\frac{1}{1}\$ in. thick mithout causing any trouble from blow in cylinder.

We are using Dunbar packing on all engines on the New York, Chicago \$\frac{3}{



Indicator Diagrams with Article on Long Valve Travel and Negative Lap.

McConnell, Superintendent of Motive Power and Machinery of the Union Pacific system, to present indicator cards showing the effect of negative lap and long valve travel on locomotives used in fast passenger and mail service on his road. The cards shown were taken from two locomotives of the same class, built at the Omaha shops, Nos. 836 and 844, the first, having a long, and the a short valve travel, the two differing only in their valve gear.

The following are a few of the principal dimensions of the locomotives.

September 2 and 1 and 1			
	Eng.	No. 836.	Eng. No. 844.
Diameter of drivers	.69 ins		69 ins.
Length of stroke	26 44		26 **
Diameter of cylinders	19 16		18 "
Travel of vaive	63 / 44		51.4 **
Travelor varve	21 . 11		76 16
Outside lap	174	2 ****	0 66
Negative lap	,vand	64 IIIS	11.1 1/ ing
Steam ports	1% by	16	114 by 16 ins.
Exhaust ports	219 by	16 "	214 by 16
Diameter of noggles	314 211	1 306 ins.	394 1118.

Engine No. 836 was built in 1892 with short valve travel and was changed last spring to 6½ in. travel, 1¼ in. outside lap, and vaives line and line inside. Indicator cards were then taken, the engine having at this time a and in double exhaust nozzle. About the 1st of September the valves were given  $\frac{3}{64}$  in, negative lap and the exhaust nozzles changed to  $3\frac{3}{6}$  in, diameter, after which indicafor cards were taken. Cards were also taken from

engine No. 844 under the conditions given above.

The steam distribution under these circumstances is shown by the accompanying reproductions of the indicator cards taken. Quite an improvement is shown by those of engine No. 836 with long valve travel and negative lap over those of engine No. 844 with short valve travel and valves line and line inside. It would appear

mmary of different methods of hanging freight car

### PISTONS AND PACKINGS.

Mr. Miller presented a brief report from the committee on "Pistons, piston-packings, piston and valve-stem rod packing—the best in service and comparative cost." Mr. Ames, of the Beech Creek road, reports using what is known as the Tring piston in fall engines up to 1891;

bered  $\frac{1}{32}$  in. over size, packing rings  $\frac{1}{32}$  in. under size. Sample piece from top and bottom of piston here for your inspection,

sample piece from top and bottom of piston here for your sample piece from top and bottom of piston here for your inspection.

The variation in size of cylinder was hardly noticeable. Engine had made 100,140 miles with this packing. New cylinders examined, in which packing had run 11 months, showed tool marks not worn out. Engine 57, new cylinders and packing, in service 15 months, making about 61,000 miles, variation in size of cylinders and packing rings hardly noticeable. In every case cylinders were free from any roughness.

The committee unanimously report in favor of nut on end of piston rod to retain spider, this being preferable to key or other method of fastenings.

Mr. Ames reports using metallic packing on piston and valve rods of all engines, United States and Jerome—in about equal numbers of each, and he believes it to be as economical as any packing in use to-day. He thinks any good design of metallic packing, either patented or home made, would do equally as well one as another. Average cost per year for piston and valve rod packing is about \$2.95 per engine.

Mr. Tabor reports his experience with metallic packing as being satisfactory and preferable to hemp. They are using hemp (Eagle brand) at present on all Dunkirk, Allegheny Valley & Pittsburgh engines: cost about 26 cents per 1,000 miles on freight, and 17 cents per 1,000 miles on passenger.

Wear on rods as follows:

Engine No. 9, passenger service, 83,604 miles, piston rod worn 31, valve-stem worn 45; Engine No. 10, freight service, 57,725 miles, piston rod worn 32, valve-stem worn 45; Engine No. 10, freight service, 53, 452 miles, piston rod worn 364 in., valve-stem worn 1-16.

Engine 11, freight service, 53, 452 miles, piston rod worn 3-64 in., valve-stem worn 1-16.

These engines have steel rods; engine No. 9 has 16 by 24 cylinder and 59-in. drivers. The other engines have 17 by 24 cylinder and 60-in. drivers. We are using on piston rods of New York, Chicago & St. Louis engines hemp, Sullivan and United States metallic packing, home mad

We have had considerable trouble with the Sullivan packing in valve stems, allowing steam to escape. The home-made and United States have been very satisfactory. The cost of Sullivan and the United States is the same, 50 cents for each for valve stem and piston rod, or \$2 per particle.

The cost of Sullivan and the United States is the same, 50 cents for each for valve stem and piston rod, or \$2 per engine.

From present experience we believe that this packing will average about 50,000 miles without renewing.

The home-made consists of three metallic rings divided in three pieces each, with a piece of 2½ in. rubber hose around same. This is placed in stuffing-box, front end pressing against steam ring. A rubber gasket is placed between back end of packing and gland. The first cost of this packing is about 30 cents for one valve stem, and costs about 10 cents per 1,000 miles to maintain. The wear on valve stems is very slight. Engine No. 159 on passenger run has made 264 miles every day except one since Oct. 1, 1893—metallic packing in valve stems, home-made—96,096 miles. The stems are worn left side, \( \frac{\partial}{\partial} \) in. right side, \( \frac{\partial}{\partial} \) in.

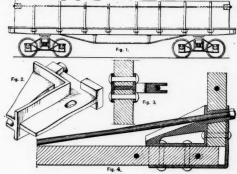
In conclusion your Committee recommends any good metallic packing as the most economical and perferable for use in all cases and T-ring piston.

The report was supplemented by the following letter from Master Mechanic Ames of the Beech Creek:

"First cost of piston packing rings is the same in both solid and bull-ring pistons, 84 cents each ring. Cost to maintain rings, per set of four rings, in solid piston, 20.75 cents per 1,000 miles; per packing, 60 cents each set. Cost to maintain piston rod packing rings, per two sets on solid piston, 14.02 cents per 1,000 miles; Death set on solid piston, 14.02 cents per 1,000 miles. The difference in cost in the piston rod packing rings in favor of the bull-ring piston is on account of the piston being low in cylinder on solid head making wear more on packing Figures given are from an experience with an engine in which the bull-ring piston has been about one year. It is probable these figures would not be borne out in all engines."

#### A Body Side-truss-rod Anchor and Brace.

The illustrations show a combined truss-rod, anchor and corner brace, and its application to a gondola car, its object being to distribute the stress of the rod over the side and end-planks so as to avoid the crushing of the fibre of the wood. Fig. 1 is a diagram of a gondola car showing the truss-rod and the manner of applying it; fig. 2 is an isometric view of the anchor casting; fig. 3 is a cross



section of the same and fig. 4 a longitudinal section through the truss-rod.

Fig. 2 shows the maleable iron auchor casting, which is placed in the inner corner of the gondola body and inside the inner corner plate. The casting is cored out for the -rod and the web passes through the thickness of the end planks and the web passes through the thickness of the ends of the side plank, form an interlocking of the side and end planks. It is held in place by outer and inner corner plates riveted together and by bolts passing vertically through the web of the anchor block.

Letters patent have recently been granted to Mr. John hoades, of Philadelphia, on this corner brace and trussrod anchor, and the inventor claims in his specifications the combination of the side and end-planks of a freight car with the side-truss-rods by means of a corner brace or anchor consisting of a rib through which the truss-rod passes and on which it bears, flanges, a web and lugs bearing upon the ends of the side plank, the size of the rib being reduced and passing through the outside corner plate to take up the thrust of the truss-rod and transmit it directly to the side and end planks, without straining

the corner plates or the bolts by which they are fastened. The anchor is a plain casting and will increase the cost of a car but little, while its advantages will be apparent to car builders. The body, side-truss-rod has become a part of the gondola with high sides, and this is one of several devices designed to anchor the truss-rods, sides and end plank in such manner as to resist the great strain upon them without crushing or injuring the planking. The shape of this anchor brace and the interlocking attachment to the planks will commend it to mechanics.

### Coupler Tests at Chicago.

As reported in the Railroad Gazette of October 26, some interesting tests of malleable iron and steel car couplers were made on Oct. 17 and 18 at the works of the Chicago Tire and Spring Co., at Melrose Park, Ill. The couplers tested, with the exception of the St. Louis, Williams and California, were obtained commercially from those using them in considerable quantities. Attempts have been made to have several of the Williams and St. Louis couphand, but as they had not been received at the time set for the tests, couplers from stock were substituted for them, and arrangements made to test the couplers sent for when they arrived.

The supplementary tests were accordingly made on Nov. 2 in the presence of a number of railroad men and others interested in the outcome of the tests. A number of tests of couplers other than those above mentioned were also made in order to complete the records previously ob-

A St. Louis coupler under the knuckle test withstood three blows at 5 ft., three at 10 ft. and one at 15 ft. before showing signs of failure, the shank then crushing slightly in the tail end. At the following blow the shank was broken off through the holes provided for the fastenings of the American continuous drawbar. In the guard aim test the St. Louis coupler withstood three blows at 3 ft. and three blows at 5 ft. At the fourth blow at 5 ft. the shank bent slightly just back of the head, and at the following blow the drop struck the point of the head, and at starting a crack from the coupling pin hole. At the twelfth blow at 5 ft, the guard arm broke off partly through the head of the coupler, the fracture showing clean, sound metal. When taken out the shank showed cracks starting from the holes for the American continu-ous drawbar. Both of these couplers were obtained from the Elgin, Ioliet & Eastern Co.

The Williams couplers tested were obtained from Burlington, Cedar Rapids & Northern Railway Co. In the

knuckle test the coupler withstood three blows at 5 ft. and three at 10 ft., when the shank bent slightly. At the first blow at 15 ft. the pivot pin bent slightly. The shank continued to bend until the fourth blow at 15 ft., when the side of the shank began caving in. At the following blow the shank broke off just back of the head, the head cracking badly. The fracture was generally clean and the steel sound. In the guard arm test the coupler showed no signs of serious damage until after three blows at 3 ft. and six blows at 5 ft., when the drop struck a glancing blow on the point of the knuckle and cracked it. At the eighth blow at 5 ft. the coupler cracked across the face, and at the following blow the guard arm broke off. The fracture showed clean, fibrous metal.

A California coupler was taken from stock and submitted to the guard arm test. It showed no sign of damage until it had been given three blows at 3 ft. and six blows at 5 ft., when the point of the knuckle was cracked as in previous tests. At the ninth blow the head bent slightly, and at the fifteenth blow a crack appeared in the shank just back of the head. This crack just back of the head. This crack continued to open slowly until the thirty-sixth blow at 5 ft., when the guard arm broke almost off.

A Hinson coupler in the guard arm test cracked across the shank just back of the head at the first blow at 3 ft., and broke in two when taken out and dropped on the ground. Another of the same couplers withstood three blows at 5 ft. in a knuckle test, and at the first blow at 10 ft. the shank broke just back of the head and the head roke in several pieces

The two Janney couplers, to which it was attempted to give a jerk test on the previous trials were fitted with fill-ing blocks and hung with the yoke attachment. They withstood three blows

at 5 ft. and at the first blow at 10 ft. both lugs of one and one lug of the other were broken off.

The Chicago couplers, which had before withstood three blows at 5 ft., three blows at 10 ft. and one blow at 15 ft., when the yoke of the drop gave out, were again put in and given one blow at 15 ft.; one coupler broke through both lugs, the other showing no injury.

# Hall Signals on the Philadelphia & Reading.

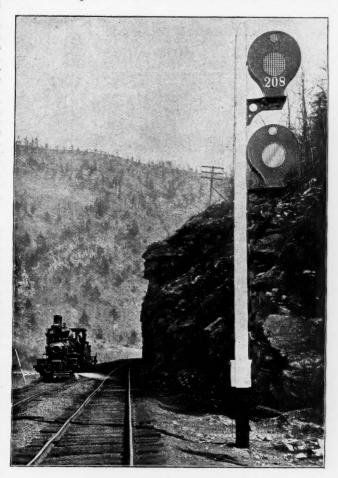
As noted in the Railroad Gazette of May 4, the line of the Philadelphia & Reading from the terminal station at Market street, Philadelphia, to Jenkintown, 10 miles north, where the New York Division diverges from the North Pennsylvania line, is equipped with Hall automatic block signals. These signals have now been in operation several weeks. They are operated by track circuits, and the block sections close to the terminal, where trains are very frequent, are about 1,200 ft. long. Each home signal has a corresponding distant signal, arranged after the fashion made familiar by the electro-pneumatic signals of the Union Switch & Signal Co.; that is, each post carries a home signal for the section immediately ahead of it and a distant signal for the next section beyond. These signals are placed on iron brackets standing out from the right hand side of an ordinary semaphore post, as shown in the accompanying engraving, which is made from a photograph taken on the Lehigh Valley near Mauch Chunk. It will be remembered that these signals are also in use on that road, as described in the Railroad Gazette of Feb. 16 last. In the illustration, the upper signal, marked 208, is the home signal. The cross lines, shown on the daylight disk and on the opening for the

night signal, are put on to show that these are red, as distinguished from those in the lower signal which are green. The signals on the Reading, like those on the Lehigh Valley, are operated by electric circuits sq arranged as to keep them normally at danger. Each distance of the control o tant signal is connected by a wire with the corresponding home signal.

#### Elevated Railroads in Chicago.

The resignation of Mr. John A. Roche, who for the past two or three years has been at the head of the Lake Street Elevated Railroad Co., has recently been accepted, and Mr. D. H. Lauderback elected to that position. This has been expected for some time, as Mr. Lauderback has been the actual head of the company, ever since the Yerkes' interests acquired control of the

road, at which time Mr. Roche tendered his resignation. It is reported that the Chicago & South Side Rapid Transit Co. has decided to dispose of its surplus real estate. At the time that the right of way was purchased by the company a considerable amount of estate was bought that was not needed for the use of the road. It was found that an entire lot could frequently be purchased to better advantage than to condemn only



Hall Automatic Electric Block Signals.

piece actually required. Some of the property is quite valuable and it is believed that the amount which can be realized will be sufficient to pay the interest ou bonds for some time to some some time to come. Plans were published last week showing a proposed loop upon which this company had been doing some preliminary work. This loop is to be single track, and extends along the alley between State street and Wabash avenue from the present terminus at Congress street to Adams street, from whence it runs west two blocks and a half to Clark street and south three blocks to Harrison street. The line runs east on Harrison street back to the main line. This loop, though not all that could be desired, is, perhaps, the best that can now be obtained. It would, at all events, be a good thing for the company, and, being a single track line, it could probably be put through at a comparatively low cost, and with less opposition from the property owners than would be encountered in case a double track line

A Supreme Court decision of considerable importance in street railroad and elevated railroad matters was ren-dered last week in the case of Tibbets, vs. the Chicago General Street Railway Co. The street railroad company in urging the dissolution of an injunction obtained by Tibbets, made the point that no private citizen could obtain an injunction against a street railroad company, but that an injunction must be obtained road company, but that an injunction must be obtained either by the city or by the Attorney General of the State. This view was sustained by the Circuit Court, Apellate Court, and now by the Supreme Court, so that the law in that respect may now be said to be established. The decision will probably affect the injunction recently obtained prohibiting the building of the proposed extension on Lake street of the Lake Street Elevated Railroad Co.

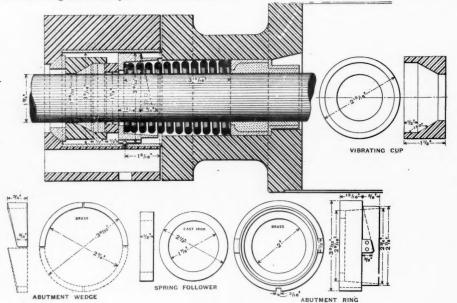
#### Automatic Abutment for Metallic Rod Packing.

It sometimes happens with metallic rod packing that the friction of the rings on the rod due to roughness or slight irregularities of the rod or lack of proper lubrication, causes the rings to follow the rod instead of allowing the rod to slide through them; this results in compressing the spring unduly, sometimes solid, and when the rings do slip finally they fly back suddenly to the normal position, jamming the rings in the conical cup and frequently breaking some of the parts. The usual method of obviating this difficulty is to use a stiff spring,

new one substituted at a very small cost. The size of this tube is such that new ones may be carried by engineers if desirable, to be applied as needed. This feature will often save the trouble and expense of sending an injector to the shop when out of order, as injectors are liable to failure at this point. This injector has been in use for several years on a number of railroads.

#### Some Tests of the Tower Coupler

We received last week, too late for publication, a letter from Mr. Willard A. Smith, Second Vice-President of



Automatic Abutment for Metallic Rod Packing-

putting undue pressure on the rings in their normal position. This causes excessive friction, or more than is sufficient to make a steam-tight joint.

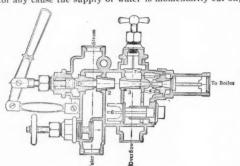
The drawings accompanying this article show an arrangement that limits the movements of the rings and so rangement that timits the movements of the rings and so prevents the flying back, when, from any cause, there is undue friction between them and the rod. The arrangement also makes it possible to reduce the free length of spring from 8½ in. to 6 in. and dispense with a washer 1 in. or more in thickness. The illustrations snow the parts in death and their relation to each other so already that

in detail and their relation to each other so clearly that a further description is not necessary.

A form similar, except in minor details, to that shown in the illustrations, has been in very satisfactory use on a locomotive of the Baltimore & Ohio Railroad since March last. The improvement was designed by Mr. F. J. Cole, Mechanical Engineer of the Baltimore & Ohio, and has been patented by him.

### The Automatic Single Tube Injector.

The injector shown in the accompanying illustrations was recently put on the market by the Automatic In-jector Co., of Cincinnati, O. It combines, as may readily be seen, a number of features important in locomotive work. It is simple in construction, the moving parts being few and the parts liable to wear being easily re-movable. It is claimed that the number of parts is less than in any other injector capable of doing the same work. It is strictly automatic, the overflow closing as soon as the stream to the boiler is established, and when for any cause the supply of water is momentarily cut off,



the injector does not break and blow back into the tank but stops injecting, and starts again as soon as the water supply is re-established.

injector is started by pulling the lever back to a stop at one movement, when if the water valve is open, the steam will draw the water up and pass it through tube 2. The automatic valve 6 is a feature of this injector and is opened by the water first passed through tube 2 when the injector is started. This water passes up around com-bining tube 3 lifting the valve 7, and passing out through the overflow. As soon as the water acquires sufficient velocity to overcome the boiler pressure, the vacuum established closes the automatic valve and shuts off the

Another feature of this injector is the small detachable ube 4, which can easily be removed when worn and a

the National Malleable Castings Co., giving an account of some tests of the Tower coupler made by the Robert W. Hunt & Co several months since, at the works of the Chicago Tire & Spring Co. at Melrose Park. The results of these tests were not at the time intended for publication, the sole object being to discover the weak points in the design of the Tower coupler. The couplers tested were taken from stock at the works of the Company. From the official report on these tests, Mr. Smith has selected the record of the couplers making the best showing in knuckle, guard arm, and jerk tests and compared them with the records of three of the steel couplers making the best showing in the test at Melrose Park, of which we gave an account October 26. The fol-

lowing is a tabula	ttion or	the.	results selected:
	KNU	CKLE	TESTS.
Blows. 51			
Chicago Coupler. 3	3		All steel.
California 3	3	4	All steel.
Williams 3	4	6	All steel.
Gould 3	2		Malleable Bar-steel knuckle.
Tower 3	3		Malleable Bar-steel knuckle.
" 0	4 2 3 3	6	Malleable Bar-steel knuckle.
	GUA	RD AR	M TESTS
Blows. 3 f	t. 5 ft.	10 ft.	Material.
Chicago 3	3	2	All steel.
California 3	5	1	All steel.
Williams 3	2	_	
Tower 3	4		All steel. All steel.
	Ji	ERK T	ESTS.
Blows. 5 ft	. 10 ft.	15 ft.	Material.
Chicago 3	3	1	All steel-Machine Brake.

17 and 18 was of a Chicago and a Gould coupler. At 139,750 lbs., both lugs of the Gould coupler broke and the 139,750 lbs., both lugs of the Gould coupler broke and the Chicago coupler opened ¼ of an inch. In a pulling test of two Tower couplers, made by the Robert W. Hunt & Co., on July 25, 1894, they withstood a maximum load of 174,200 lbs. The lower lug of one bar then broke as did also the locking block. The knuckle and locking block of the other coupler still worked freely. The Tower Couplers tested had round shanks. It is the intention, however, to use only the square shank as shown in the however, to use only the square shank as shown in the Railroad Gazette of October 26, and further tests will be made as soon as the patterns can be changed to this form. It is believed by the National Malleable Castings Co.
that the Tower Coupler will then be able to make
a better record than that given above, which is certainly creditable one

# A Course in Engineering.

In the Polytechnic for October appears a paper by Professor W. G. Raymond, of the Rennsalaer Polytechnic Institute, being what he calls "a suggestion" for a course in engineering. A tabular view of the course, covering six years, is presented, showing the time allotted in each This, however, we do not reproduce year to each study. but give a few extracts which are enough to show Profes sor Raymond's idea:

sor Raymond's idea:

No two boys are found prepared alike. The result is unsatisfactory and in the opinion of the writer the aim should be to arrange a course for engineers beginning where the grammar school course ends. A large part of the difficulty developed in the establishment of any engineering course arises from the lack of oneness of purpose in the arrangement of the boy's studies after he leaves

the grammar school . . . . It is believed that the engineering school should take the boy just from the grammar grade and should carry him through a course lasting six years, and more or less similar to that to be outlined in his paper; a course which in less time than is now required by the public schools and colleges, will better fit a boy to begin the practice of engineering than will any combination of schools with which the writer is familiar. At the same time it has been attempted, in arranging the course, to give a somewhat more thorough training in language, both English and French, than is usually secured in the technical school. . . The following principles have guided in formulating this course of study:

I. Pure mathematics, the indispensable tool of the engineer, should be mastered at the earliest possible point of the boy's educational course.

II. Drawing, and those sciences requiring but a limited knowledge of mathematics, as well as language study, should be given at as early a period as the boy's development will permit.

III. Continuous prosecution to completion of a study once begun is advisable.

IV. Daily recitation, rather than lecture, is advisable for undergraduates.

V. A practical acquaintance with the methods of the wood worker, metal worker and mason, is of great importance, if not absolutely necessary.

VI. In the engineering courses as given to-day there is not time for the practical use of tools that is implied in V.

VII. It is unwise to specialize, distinguishing between

wood worker, metal worker and mason, is of great importance, if not absolutely necessary.

VI. In the engineering courses as given to-day there is not time for the practical use of tools that is implied in V.

VII. It is unwise to specialize, distinguishing between the various departments of engineering; but the graduate of the school should be prepared to follow any one of the many branches of engineering into which chance or taste may lead him.

With iegard to III there is believed to be a considerable loss of momentum when exercises are held one or two or three times a week with intervals given up wholly to other branches. The writer knows there is another side to this.

Principle IV seems to need more argument than some of the others. It is believed that the storent sloud be feet many pursue, and should have some knowledge of as many more as possible. It is not intended to do away entirely with lectures, or takes by the teacher, making him a mere machine, for the value of these talks is fully understood; but the text book should be the basis of work and the lectures merely supplemental. In no other way than by daily recitations can the teacher know what the student is doing and how well he understands the work in hand. It is the teacher's business to see that the boy learns something, rather than to load himself with facts and demonstrations and fire them at the boy learns something, rather than to load himself with facts and demonstrations and fire them at the boy regardless of whether the shot takes effect on flies wide of the mark.

Principle V has been sufficiently argued in the various papers and books that have been written on the subject of Manual Training, and principle VI seems hardly to need argument. It may be said, however, that the write does not wish to undervalue laboratory work; but he believes that too much is easily possible, tending to produce experimenters rather than practical constructing engineers of the country. It may be argued from this that no shop work is necessary or valuable in

outline of Grecian, Roman, and English History and to read a similar outline of French History in the French course.

In science the less mathematical subjects of Physiology, Physical Phenomena, Botany, Inorganic Chemistry, Commercial Geography, Geology, and Mineralogy, are finished in the first three years, while the mathematics necessary to the study of Mathematical Physics, the foundation of engineering science, is being acquired.

The Drawing of the first three years includes, besides the practice in free-hand work, Lettering, Projections (on two planes, of objects in one angle), something of Shades and Shadows, and drawing of machine parts and machines from sketches and actual measurements. It includes also work with the brush. The general subject of Descriptive Geometry may then be completed in the fourth year, and the drawing of the remaining years will be given up to work in connection with the various technical subjects pursued. It will include Mapping, the subject usually known as Stereotomy, and drawing of structures and machines from measurements and for original designs.

The shop and tool work is such as is given in the Manual Training School, to which is added a course in Masonry and Stone Cutting. This latter is to be a practical examination of the various materials and tools of the mason, the mixing and handling of mortars, the laying of brick, (including straight wall, corners, and the turning of an

arch), and a small amount of practice in cutting the various building stones, that a practical idea may be obtained of the relative difficulties.

The practice in surveying is to be performed almost entirely in the summer, four weeks being given to it in the vacation between the fourth and fifth years and an equal time between the fifth and sixth years.

In the technical subjects of the fourth, fifth, and sixth years it is expected to cover the ground usually covered by the colleges teaching those subjects.

The graduating thesis is to be a design of an important structure or machine, or the investigation, from an engineering standpoint, of a commercial enterprise, such as a railroad, water power, or electric plant. Not a mere review in any case, but a careful investigation, such as an engineer would make if required by the owner to report on the plant as to its worth and possibilities for betterment.

#### A War Time Bridge.

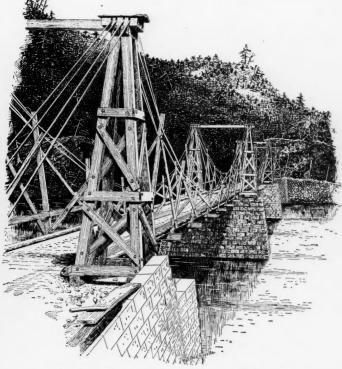
The accompanying illustrations show an incident of war bridge building. These were made from photographs loaned us by Prof. Geo. W. Plympton, M. Am. Soc. C. E. and are, as far as Prof. Plympton can learn, the only ones In our issue of Aug. 24, appeared an

Passengers who wish to travel in a class higher than that which their ticket calls for, but lacked time to make the exchange at the station, will not be charged a mark for the privilege of exchanging, as was required formerly, but only the difference in fares. An entire car will be provided for the carriage of a sick person, either a baggage or freight car, or a third or fourth-class car from which the seats have been removed, for single first-class tickets, while six of such tickets were formerly required. It is no longer required that a passenger present th half of a round-trip ticket to be stamped at the ticket office before entering the train. The fee for ordering tickets and baggage receipts by telegraph in advance (often done where there are

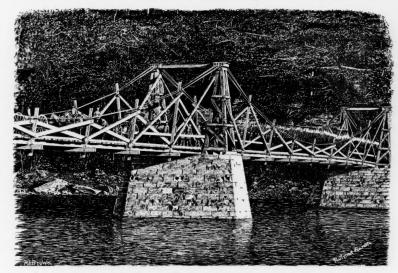
no through tickets, to avoid delay at junctions) is reduced to 6 cents.

The Bavarian Government besides its general railroad system, has 29 local railroads with an aggregate length an aggregate length

land, O. The company has been experimenting for some time in the design of these posts, aiming to get such a distribution of the metal as would give a light, stiff, strong, durable and handsome post, at a low price. These shound, durante and nansome post, at a low price. These posts are made of sheet steel, pressed into the several shapes shown, and coated with a non-corrosive compound to keep them from rusting. Being tapered they have a substantial look and the section is such that they are very rigid. They can be driven into the ground, saving all the expense of digging, and are not lifted by frost. They can be easily and cheaply transported, being light in weight and nesting so that they stow very compactly. They are applicable to wire fences of all sorts, smooth,



The Gauley River Bridge-New River Cliffs behind.



The Gauley River Bride-Rosecrans' Troops Crossing.

abstract of a paper on "Reminiscenses of Early Iron Bridge Building," read by Prof. Plympton before the last annual convention of the American Association for the Advancement of Science, in which this bridge was re-

During the night of Sept. 10, 1861, after the battle of Carnifex Ferry, in which the Union Army, under General Rosecrans was victorious, a detachment of General Wise's army, under command of General John General D. Floyd, abandoned their camp and retreated across the Gauley River, W. Va., destroying the bridge then standing, together with such boats as were near. They then climbed the steep cliffs on the opposite shore, known as New River Cliffs, and entrenched themselves. Soon after, the military authorities called for a bridge to replace the one destroyed, in order that General Rosecrans might fol-

Mr. John W. Murphy an associate of Prof. Plympton during the construction of two Whipple truss bridges in 1856, one over the Saucon Creek, Pa., and the other across the Lehigh for the Beaver Meadow Railroad, went on to Washington and submitted some original plans for a military suspension bridge, which were at once accepted by General John G. Barnard, then Chief Engineer of the Army of the Potomac. The time allowed was 24 days.

Mr. Murphy stated at once for the site of the proposed bridge, writing out his bill of materials in the cars. By telegraphing he found that the cables and lumber could be had without delay. The abutments and piers of the destroyed bridge still remained in good condition. Pyramidal towers were constructed of heavy timbers, and instead of suspending rods, a loosely framed truss was hung upon the cable without being fastened. This truss connected the cable with the floor of the bridge. The total length of the bridge was about 120 ft. and it was completed in 22 days. It was constructed under fire of the enemy from New River Cliffs. The only damage done was to a float used in building, which was pierced done was to a float used in building, which was pierced by a cannon shot, without serious results.

The photographs, from which pen drawings were made for engraving, are of the war time too, and not very sharp in detail. The draftsman has, however, reproduced them with fidelity.

### Foreign Railroad Notes.

The Prussian State railroads made the following changes in passenger regulations last year: Passengers may exchange tickets of a higher class for those of lower classes under all circumstances, while formerly this could be done only when there were no unoccupied seats in the class for which the first ticket was bought. Passengers who voluntarily notify the conductor that they were too late to get a ticket at the station are required to pay only

of 402 miles, or an average of 14 miles each, the longest being 30 miles, and nine of them less than 10 miles long. They have generally a very light traffic and their average rates vary from 1.10 to 2.38 cents per passenger mile and from 1.65 to 7.78 cents per ton-mile. All but two of them make some return on the capital invested, the average being 21/2 per cent., after providing for renewal funds.

The locomotive works of Krauss & Co., at Munich and Luinz, celebrated last summer the completion of their 3,000th locomotive. These works began in 1866, and for the very first engine built received a gold medal at the Paris Exhibition of 1867. The works have made a specialty of small locomotives for local roads, mines, factories, etc. They have sold engines in nearly every European country and also in Australia, Brazil, the Argentine Republic, Cape Colony, Japan, Java, Morocco and Siam. The aggregate value of its product has been something over \$20,000,000. The average number of employés last year was 1,071.

### TECHNICAL.

# Storage Battery Traction.

Electric storage battery traction is to be introduced before the end of this month on the street car lines of two small German towns - Hagen and Eckesey, in Westphalia. Waddell-Entz batteries are to be used.

Electric Welding of Street Car Rails in Brooklyn. An interesting experiment is being made in Brooklyn by which it is hoped that the evil of electrolysis will be done away with. The Nassau Electric road, now under construction, is welding its rails and making them con-tinuous by an electrical process similar to the system used in Boston and which was illustrated in our issue of July in Boston and which was illustrated in our issue of July 14, 1893. The work, which is in charge of the Johnson Co., of Johnstown, Pa., was somewhat delayed this summer by the insufficient voltage at first used in welding. The company received their current of 500 volts from the Atlantic Avenue trolley road. They later erected a tem-porary power plant of their own and are now using 600

# The Canadian "Soo" Canal.

The Canadian Soo ship canal will not be ready for actual work before the opening of navigation next season. The machinery for handling the gates is not yet in position and there is considerable dredging to be done at the upper end of the canal.

### Pressed Steel Fence Posts.

A novelty which has the appearance of being a valuable late to get a ticket at the station are required to pay only one mark (24 cents) in addition to the regular fare, as previously, but not more than double the regular fare. | step in the use of steel is shown in the engraving herewith which represents several forms of pressed steel previously, but not more than double the regular fare. |

bath, or woven, the wire being fastened by a staple inserted through the holes, which allows the wire to move under contraction and expansion. The method of fastening appears in the small sections at the top of the

A great difficulty in the use of metal posts heretofore



Pressed Steel Fence Posts.

as been that the surface in contact with the earth was too small to give the post stability, and another difficulty has been that through faulty design unnecessary weight of metal was used. It is believed that these objections to the use of steel posts are overcome in the design offered by the Avery Co.



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#### EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contractfor new works or important improvements of old ones, experiments in the construction of roads and machins ery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that

lished.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such malter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The chief interest to engineers, as engineers, in the overwhelming election on Tuesday is the approval by the city of New York of the proposition to build a system of rapid transit roads in that city by municipal aid. If there is any force in the opinions of a number of eminent judges and lawyers, that have been published in the daily newspapers, the constitutionality of the scheme will be contested; but meantime the commission will push forward its plans, in general and in detail, with a view to the speedy beginning of the actual work of construction. We beginning of the actual work of construction. do not regard the favorable vote on this proposition as a triumph of sound policy, and are still very doubtful of the wisdom of the city lending its credit to the enterprise, which seems to us one that should be undertaken by private capital, and for which private capital could be raised if it was not burdened by onerous conditions, and if a reasonable prospect of a good interest on the capital could be shown. Nevertheless, there are many very excellent arguments to sustain the other side of the question, and we cannot regard the triumph of the promoters of municipal aid as an unalloyed misfortune. There are facts of enormous importance in the situation; the commission itself is one of high character, and that the control of the affairs of the city of New York has passed for the present out of the hands of the criminal and semi-criminal class.

The Committee report on signal-light colors, presented at the recent meeting of the American Railway Association, is briefly discussed, as regards its main feature, in another article. Another point of interest is that concerning the uselessness of blue glass with oil lamps. While every one who has experimented at all, or who is familiar with car-inspectors' signals, knows that it is very hard to make a sufficient quantity of light shine through a blue glass, it is well that the fact has been put on record in this formal manner. Some people will heed it now who otherwise would not. The report says that blue might possibly be used for the caution color if the flame were pure white. This "if" is well put, and it may be of some importance, for, as every one knows, street signs, composed in part of plain, thin blue glass are used successfully with electric arc-lights. It is not impossible that we may some day have a really white light for signalling. But even with this difficulty removed,—and this is why we mention the subject of blue,-there is still the objection that, practically, blue and green are too near alike to be used for con-trary indications. They are totally different colors to be sure; but people have very loose habits in naming colors, and glass makers seem to be prone to make blue-green glass more than they do pure blue or pure green. From these causes, and possibly from more or less natural inability in some persons to quickly distinguish between the two colors under unfavorable circumstances (the experts do not give us much light on this point), it is not safe to trust to the average man to decide unerringly a hundred times in a night whether a light is blue or green. The use of blue is therefore practically out of the question. The value of violet as a signal color, is largely due to the predominance of red over blue in

its composition. This is evident in two ways; first there seem to be fewer persons who, from defective color sense or lack of training in color names, confuse red and red-violet than confuse green and blueviolet; and, second, according to the universal usage on railroads, it would be less dangerous to trains to confuse a violet caution signal with a red (danger) signal than to confuse it with a green go-ahead signal.

The Eastern and the Western roads have finally come to an agreement on the reduction to be made in the rate per mile for freight cars interchanged (from 71/2 mills a mile to 6 mills) and the new rate went into effect generally on November 1. pears that the meeting in New York last week decided upon this by very harmonious proceedings. exception of all cars owned by shippers with whom any road has a special contract (mostly refrigerator and oil tank cars), leaves the bars down for all the abuses which it is desired to cure, but we understand that, as far as the Eastern lines are concerned, there is only one contract of much importance and that one runs only till the end of this year. very favorable, and, with the general disposition to reform the well known evils in this matter, which is said to be strong and hopeful, the change has good prospects of success. How far it will help us toward the true desideratum, the per diem system, is yet to be seen. A reduction of 20 per cent. is not large enough to greatly affect the private car companies which succeed in getting some railroad to keep their cars running 50 or 100 miles a day, and yet it is large enough to reduce to nothing the balance of income enjoyed by some railroads which are large lenders, so that a few months' operation may develop opposition. But with the strong roads in favor of the six-mill rate it will certainly be faithfully tried and we shall at least have a slight change from the long worn rut. This—anything to keep the general subject up, where it will receive attention and discussion—is the only means now in sight by which to increase the sentiment in favor of the per diem principle.

It is not clear whether the action of the New York meeting looking to the cure of rate cutting will effect the desired end or not. The species of rate cutting most complained of now is that effected by changing destinations. The regular seaboard rates from western points now apply to so many eastern towns that the proportions received by an eastern trunk line on ten cars of corn, all from the same starting point, and all billed through at the New York or Boston rate, may be ten different sums. This affords ample opportunity for manipulating the billing, and the long intrenched custom of changing destinations to accommodate shippers, makes it possible to change bills by the hundred without arousing the suspicion of any auditor or other puritanical individual who may happen to think such doings are wrong. At first thought one would think that a railroad manager who likes to cheat would use this device for the purpose of increasing the receipts of his own road; it is easy enough. Not so: not by any means. Men who do this have such a warm affection for the down-trodden public that they never take more than their share except for the purpose of giving the surplus to the shipper. It is now proposed that way-bills shall be inspected at important transfer points by the agents of the weighing and inspection bureaus, who, being entirely independent of local agents and freight solicitors will probably be strict and impartial. these inspectors know how to perform their duties efficiently is evident from the fact that they still return large profits to the roads by their corrections of short weights and deceptive classifications. Central Traffic Association territory they have raised way bills half a million dollars in the last six months. One would think that false billing would begin to abate after being subject to such a repressive agency for a number of years, but these figures seem to show to the contrary. Evidently the guilty parties utter a prayer of thanksgiving that the inspectors have made their crime unsuccessful, and so have removed it beyond the reach of the law, and-then take a fresh start.

The recent decision of Judge Ross at Los Angeles in the suit to compel the Atlantic & Pacific Railroad to grant facilities to the Postal Telegraph Company equal to those enjoyed by the Western Union, seems not to be quite so sweeping as was indicated by the dispatches printed in the daily papers. A full abstract printed in a California paper shows that the Postal Company's principal demand was to have poles and wire distributed along the line of the road; from which we infer that it proposed to build the line outside the railroad's right of way. This demand the

judge orders the receivers of the road to comply with, on payment of reasonable compensation. likely this decision will stand. Even if the Postal had asked to "divide the traffic," that is, to build on the road's premises and have an office in every station on equal terms, it is not certain that it would not have succeeded, although in most cases such an encouragement of competition would be contrary to public policy. In a sparsely settled country like that traversed by the Atlantic & Pacific, a monopoly is better than two lines, unless the monopoly is oppressively managed (and the oppression is beyond the power of the Court to cure). The business is so small that the double administration and management is a waste of energy for which there is no adequate compensation. But the Courts are very tender in their administration of abstract justice when dealing with the Governmentaided railroads, and they have been inclined to favor 'the people' in their demand for competing facilities even where the competition is wasteful. making the transcontinental railroads post roads, etc., is interpreted to give a free field for a dozen lines of poles, the same as a wagon road gives right of way to a dozen wagons. Judge Brewer's decision in the Union Pacific case, now pending before the United States Supreme Court on appeal, was about as broad

But when the Postal Company asks simply for conveniences in constructing a line, the emphasis shifts to another set of questions. Generally a railroad may fairly claim the right to deliver freight only at stations. To deliver along the road is costly and dan-gerous, and, if it is done, the imposition of high charges is warranted. At the same time railroads are doing this work every day for themselves, and they do it for the Western Union all over the country. On a road in a level country, running few trains, the danger may be reduced to a minimum. In these circumstances the railroad will probably have to present a strong case, and show that the existing telegraphic facilities are good and reasonably cheap, to get Judge Ross' decision reversed. The present case was complicated too by some pretty savage clauses in the Western Union's contract with the road, which may well have aroused the judge's ire. Not only was the road asked to refuse all transportation facilities to the opposition company, it was even told that it could not legally sell drinking water to the construction gangs in the desert, though it is constantly selling to ers. Again, the road runs through some gorges in the mountains where to deliver poles outside the right of way would be so costly as to make the erection of the line almost if not quite out of the question. In such a case the public duty of the railroad, always paramount theoretically, is pretty sure to be construed on broad lines. In fact, the aim of the Postal Company being to get to California (not to do a way business) this might become a controlling element; or at least an entering wedge, by which the competing line should get its first foothold.

# The United States Court on the Window Shade Case.

The decision of the Interstate Commerce Commission ordering a reduction in the freight rates on window shades from Oswego, N. Y., has been reversed by the United States Circuit Court at Utica. This decision, reported in the Railroad Gazette of April 27, was written by Commissioner Veazey and was based on a most elaborate investigation of the weights, bulk and value of shades, decorated and plain, shade cloth, sticks, and shades mounted on sticks, on the reduction in the cost of manufacture, the alleged acquiescence of the railroads in false classification, and other things. The railroads refused to obey the order and the Commission asked the court to enforce it. Judge Wallace, after listening to arguments by Hon. John D. Kernan for the Government and the shippers, and Frank Loomis of the New York Central for the railroads rendered the following very brief decision:

roads rendered the following very brief decision:

The order of the Interstate Commere Commission, which the court is now asked to enforce, prohibits the railway carriers, the parties respondent, from charging any greater compensation for the transportation of window shades of any description, whether the cheap article, worth \$3 a dozen, or the hand decorated article, worth \$10 a pair, than the third class rate, the rate charged for the transportation of the materials used in making window shades. Such an order in my judgment ignores the element of the value of the service in fixing the reasonable compensation of the carrier, and denies him any remuneration for additional risk. I cannot regard it as justifiable upon principle, and must refuse to enforce it.

Whether the brevity of this decision is intended as a judicial rebuke of the unnecessary length of the Commission's report we do not know, but it is somewhat suggestive. The report went into particulars almost to absurdity. Unquestionably just conclusions were drawn on several of the points at issue and the

was sustained to a considerable extent by the fact that the railroads had been carrying valuable articles lower than goods very much less costly; but Judge Wallace is right, nevertheless. The Commissioner's decision is unsound, not so much because he does not decree abstract justice to the parties interested in this particular case (the railroads and the consumers), but because the evil he is aiming to cure canuot be cured in this way.

Judge Wallace's language, standing as it does with-out qualification, may seem to lean a trifle to one side, to overlook important points elaborated by the Commission, but he enunciates a principle that cannot be ignored; that transportation rates may lawfully be made according to what the traffic will bear. The Interstate Commerce Commission has, indeed, recognized this principle right along, in its discussions, but its decisions are generally based chiefly on something

The real point of trouble in such cases as these is hard to get at. Railroads carry valuable freight at rates less than those they are constantly charging for cheap goods; and they often do great injustice thereby to themselves, the same as they do by rate cutting on grain or in other familiar ways, but the injury done this one sort of discrimination is in majority of cases more apparent than real. and silk are carried across the continent at rates which would be unreasonably low for coal or iron, worth a hundredth or a thousandth part as much per ton; but who is harmed by it? It would be a fine thing if ideal standards could be applied to all such conditions as these, but who can do it? The railroads can do it, if any one; and it cannot be done by law for the law must be at least theoretically just, and in this matter we cannot even attain to that. the most hopeful way to attack the evils of discrimination in freight rates will be to always get good and wise men into the traffic offices as well gress and on the commissions.

#### Amber-Colored Lights for Caution Signals.

The American Railway Association Committee, in its report printed in our issue of Oct. 26, made commendatory mention of the Chicago western's green-and-red distant signal lamp. While not every signal expert feels as sure of the favorable balance of the merits of this form of signal as are the Chicago & Northwestern people, its successful use for several years gives it a first-rate standing, and so far as we know, it is the only arrangement for indicating caution by color at night which has been put into actual use for any length of time where green lights are used for all clear. (The ordinary English practice cannot be considered, for the English night caution signal is precisely like the stop signal.) But it is hardly to be supposed that there will be a general and prompt agreement to use red and green for distants, and perhaps the committee dismissed amber-colored glass rather hastily. The committee has done a valuable service in clearly presenting the facts set forth by Mr. Quereau, but the things said against amber do not by any means condemn it for the use for which a third color is wanted.

What is this use? Simply to provide a caution indication on a high post, fixed in one position and generally remote from other signals. Rarely do we want two distants at the same point. There is no logical need for a caution signal in switch lights or on low signals. There is no pressing need for a caution color in hand lanterns. Some of the discussions on this subject indicate a feeling that there might be troublesome confusion at this point, but there is nothing in practical experience which warrants such apprehension. In England, on roads using green for all-clear, hand lanterns showing green are used to indicate caution when in motion (swung crosswise of

Our present!caution color is used for tail lights on trains, for "classification signals" on the front ends of trains, for stopping passenger trains at flag stations and as a temporary fixed caution signal at such places as weakened bridges. Some very good roads get along without any of these. Any road can get along with-out them if the attempt is made; that is, there are substitutes for the light with the third color, which would not be objectionable, except on account of the expense, and it may be that the expense would be no greater than that of other expedients proposed. But leaving for a moment the difficulties of tail lights and hand lanterns, which will not be entirely removed by adopting the Chicago & Northwestern practice, let us consider fixed signals alone.

1. An amber caution signal may look like red and so stop a train unnecessarily. But surely this cannot so stop a train unnecessarily. But surely this cannot be a serious objection. How long would an engineman wait at such a light before he found out that he found out that he

had stopped unnecessarily? The interval would have to be represented by a minus sign, for he would find out before he actually stopped. As English roads which for years have used red as caution signals seem entirely satisfied with the plan, why should we give so much weight to theoretical objections?

2. The amber glass may be too pale and make the light look like an ordinary "white" light. It is desired to get rid of white entirely in fixed signals and we have here our strongest objection. But why can not the golden mean between "white" and red be uniformly attained by the glass makers? Railroad superintendents who have experimented with amber speak to us favorably of it. Admitting the liability to confusion, however, what is the likelihood of danger? It must be exceedingly remote. White will be safer when it indicates caution, than now, when it indicates all-clear, for an obvious reason. Beside this, when we adopt green for allclear and something that looks like white for caution, we shall be using far fewer of the latter color than now. This reduction in number is alone sufficient to justify careful consideration of the claims of the innovators, even if they proposed pure white for caution. Again, a distant signal can generally be placed so as to avoid confusing street or dwelling house lights, if Where it is not near buildings its position can generally vary 200 or even 500 feet longitudinally or 10 to 25 feet vertically, without inconvenients. Where it is near a home signal or on the same post with it the danger of confusion is reduced to a ninimum because the home signal serves as a landmark.

All these arguments about the danger connected with white seem of small account, and the position of the other side appears strong, when we reflect that after all an engineman always wants to find, at a fixed signal, not a signal to stop or to shut off, but one to go on; and that if he is properly trained, the uppermost idea in his mind is to find the go-ahead signal. The absence of that is sufficient warning for him not to go on.

The real difficulty in using green for all-clear will be with the classification lights on engines, and the tail lights, for American railroad men are probably more wedded to custom in this matter than they are in fixed signals. But a form signal or an inferior color signal (like violet) is not nearly so objectionable in these places as it is in a semaphore and the difficulty is not likely to be insurmountable. As the use of the block system increases these train signals become of relatively less importance.

# The Heilmann Locomotive.

We have thought it right to note from time to time, rather as a mechanical curiosity than as a matter of serious scientific interest, the progress of the Heilmann locomotive. Now that the Western Railroad of France is building two of these machines with certain modifications and improvements, and that various writers have taken up this locomotive and treated it as a possible machine for practical service, it seems worth while to attempt a somewhat critical analysis of the theory underlying its construction and of the working details. We append a note of reference to some of the more important articles on this engine which have appeared within the last two or three years in the technical journals, in order that those who care to look further into the construction of the machine or the experiments with it, may do so.

It does not, by any means follow from the fact that the Western Railroad Co. of France is going on to build two of these locomotives that the responsible officers of the company have any confidence in the utility of the contrivance. We are all familiar with instances where railroad companies, or locomotive builders, have kindly undertaken to construct and bring forward new locomotives at the expense of the inventor; and it is even possible that the Western Railroad of France can make a little money by running its shops on the building of these machines

The Heilmann locomotive, which was built and tried last year, was shown in our pages May 5, 1893, where appeared a very fair picture of the machine in work ing order. That engine had two, 8-wheel trucks with an electric motor on each axle; that is, 8 motors for one locomotive, and on the main frame stood a boiler of the Lentz type, two tanks for water, bunkers for coal, a compound, non-condensing engine, an electric generator, direct driven and a small 2-cylinder steam engine directly connected to a small dynamo to furnish current to excite the field magnets of the generator. Furthermore, there must have been all the minor parts necessary to the operation of a locomotive boiler and besides that the apparatus necessary to the operation of an electric plant.

The engines now building differ from the one which we have so briefly described above in that the new engines will have two 8-wheel bogie trucks and 8 motors, one truck carrying the boiler and the other the engines and dynamo. Ordinary locomotive boilers will be used instead of the Lentz corrugated. Instead of the 800 horse-power, horizontal engine used before each of the new locomotives will have a 1,500 horse-power Willans' vertical engine and the power of the dynamos will be correspondingly increased. In the earlier locomotive the armature of each motor was mounted and revolved on a hollow steel shaft, or tube, keyed to the axle. In the new locomotives the hollow steel shaft will be independent of the driving axle and will transmit motion by means of an elastic coupling.

The claims made for this locomotive are that with it higher speed can be made with greater safety, less destruction of track and an economy of fuel. Mr. Du Riche Preller writing recently in Engineering says that the engine weighs 120 gross tons, that it hauled 63 tons of passenger coaches from Paris to Mantes, 36 miles, and 72 gross tons from Mantes to Paris on the return trip. The maximum grade going is 35 feet per mile for 4 miles, followed immediately by a down grade of 26 feet per mile, 21/2 miles long. There is another hill with grades on both sides of 26 feet per mile, 2 miles long on one side and 31/2 miles long the other. Certainly this line would not be considered a heavy one to operate in the United States, and the profiles are so nearly alike in both directions that we may take the average train, say 671/2 gross tons or 751/2 net tons, as the measure of the performance of the locomotive over a distance of 36 miles on a line where the down grades practically balance the up grades, and where the maximum is but 35 feet per mile and only 4 miles long. The average speed going was 4334 miles and returning 3614 miles, or an average of 40 miles an hour for the round trip. The maximum speed is given as 62 miles, but it is not said whether this maximum was reached on a down or an up grade; but we may assume that the maximum was reached on a down grade near the foot of the hill. If the maxispeed had been made on the up grade about 1,050 horse-power in the steam cylinder would have been required allowing for friction and other losses, and this would be beyond the stated capacity of the engine. It is said that "by special permission the electric locomotive ran at its maximum speed" hence 62 miles an hour is the maximum that can be made with this 134-ton (short tons) locomotive on a down grade of 26 feet per mile when hauling 67 tons of train beside itself. It is said that the co-efficient of traction was 13 pounds per ton, but as this co-efficient is not explained one cannot be certain whether this means the resistance of the train or the push on the pistons reduced to draw bar pull, but whatever it is it is claimed that this is a very small amount and it is given here in justice to the motor-some readers may understand The saving in fuel is given as 15 per cent. The following from Mr. Preller's description illustrates the color of the articles written in favor of this motor:

color of the articles written in favor of this motor:

"These results were the more conclusive and encouraging as they were not only obtained on a line with rising and falling gradients varying from 1 in 200 to 1 in 150, and laid with indifferent and comparatively light permanent way (70-lb. rails), but were achieved with an essentially experimental locomotive, whose admitted mechanical defects greatly militated against the unexceptional and admitable electrical part of the machinery, viz., the generator-dynamo and the motors, developing their maximum power."

In this country some of the heaviest and best service is done on just such track, and if the Heilmann motor failed it is safe to say it was not because of the inferiority of the permanent way.

We may take the average train hauled by this motor and compare it with certain light service in this country. It is less than a four-car loaded train on the Manhattan Elevated, and yet the Manhattan's small locomotives haul five-car loaded trains up grades almost three times as steep. These locomotives, however, weigh but 27 tons (short) while the Heilmann weighs 135 tons. The Heilmann motor weighs as much as a heavy consolidation locomotive and tender, and such a locomotive will haul more than 800 tons at a good speed up the grades and over the road on which the Heilmann motor is operated. The saving in fuel is given as 15 per cent., but it is not said whether this saving is per car-mile or per ton-mile, and this is important, for the train including the Heilmann motor weighs much more than the same train with a steam locomotive against which it was tried. The average local train service in this country is much heavier than that performed by the Heilmann motor, the trains are about four times as heavy, the speeds as high or higher, and the locomotive and tender combined are about half the weight of the Heilmann motor. Four times the work is done in every-day service with about half the weight of locomotive.

Perhaps nothing more is necessary in the way of

argument about the first Heilmann motor; the promoters confess a failure of the mechanical features and from an operating standpoint the motor is a failure in power. Having gained this much experience, it is said that two more locomotives will be built weighing about the same, but modified as told above. The change in construction increases the complication materially, and by it will be lost one of the claimed advantages, viz., the removal of the parallel rods and driving gear, and there will be introduced a construction, viz., eight or sixteen elastic couplings, which will give more trouble than the worst form of parallel rod ever devised.

But the motor ought not to be dropped without enough analysis to show the theoretical limits of its possible saving. It may be taken as axiomatic that no mechanism can save more in itself than a theoretical analysis shows to be the maximum possible limit, provided, of course, the theory is complete and true. The theories of steam engines and dynamos are too well worked out to permit any doubt of their completeness and truth, and well worked out theories can be applied to the Heilmann motor with perfect jus-tice. Of course, with any motor there may be incidental savings such as decreased cost of repairs, reduction of difficulties of operation, less parts, less labor, and less wear and tear of track, but in none of these incidentals is the Heilmann motor better and in most of them it is worse, than the ordinary locomo-tive, therefore one can stick closely to the theoretical analysis and yet do justice to the Heilmann system. Perhaps the simplest way to compare the Heilmann motor and steam locomotive is to take a pound of coal and carry it through the different stages until we see what power it will develop in the two systems.

The Heilmann motor has a locomotive boiler, and this simplifies the comparison, as the boilers are of the same kind in the two machines and are worked in the same way. Less fuel may be required with one motor than with the other, as determined by this analysis, and hence it may be that one boiler would not be so much forced as the other in doing the same work, and therefore there would be a difference in the efficiency of the boiler; but this can be omitted at the start and allowed for at the end of the analysis, with accuracy. It can then be assumed that the two boilers will operate with the same efficiency as the steam locomotive boiler when doing hard work with good coal, that is, they will evaporate say six pounds of water per pound of coal used.

A compound locomotive, running under fair conditions, will give an indicated horse power for one hour for 26 pounds of water used in the shape of steam. We are now talking about good performance of both This requires in the steam locomotive, 4.34 pounds of coal per horse-power per hour. Willans compound engine, non-condensing, running under the best conditions, that is, conditions of a stationary plant and tested by the inventor, and running about at the point of cut-off that will be required of it for the Heilmann motor, used 21 pounds of water per hour per indicated horse-power. There was no back pressure in the low pressure cylinder, and the conditions were such as to give a maqimum efficiency or nearly so. When the Willans engine is used in the Heilmann motor there must be some back pressure to blow the fires of the locomotive boiler, or there must be a fan to make a forced draft, which will amount to the same thing, and the water per horse-power per hour will be considerably increased; so that it will not be reasonable to assume less than 23 pounds of water per horse-power per hour with the Willans engine plant, when it has to be worked on a moving locomotive, under a varying load, and to blow the fires under a locomotive boiler. It must be remembered that the tests of the Willans engine which gave a water rate of 21 pounds were under a constant load. This means that in the Willans engine on the Heilmann motor a horse-power will be produced for 3.84 pounds of coal. The steam locomotive with which it is being compared has been shown to require 4.34 pounds.

Between the indicated power in the cylinders of the steam locomotive, and the draw-bar of the train, is a loss of about 8 per cent. in internal friction, leaving out the main bearings of the axles, but counting all other bearings and the parallel and main rods. The friction of the journals may be taken as the same in the steam locomotive and the Heilmann motor, without doing full justice to the steam locomotive for the reason that the driving wheels are larger and therefore the friction of the axles is less in percentage; and further, because the steam locomotive, when of equal power, will not weigh much more than one-half of the Heilmann motor. It will be fair, then, to that motor to compare the cost of power as it is applied to the axles without going back to the draw bar. A reduc-

tion can be made later to show the advantage that the steam locomotive has in the point of weight.

Allowing for the 8 per cent. loss in the internal friction of the steam locomotive, the coal per horse-power per hour applied to the axles is 4.73 pounds.

The Willans engine and the connected generator will have a friction of at least 10 per cent., as there are heavy weights on the bearings, namely, the armature of the generator; and the efficiency of the generator under a varying load cannot be taken at more than 90 per cent., so that the loss in internal friction and in the generator would be with a varying load and speed, not less than 20 per cent., and even if the speed was constant this loss could not be considered less than 18 per cent. One horse-power for one hour in current will then require the expenditure of 4.8 pounds of coal. There is a further loss in the motors. It must be remembered that these motors are of the direct connected type and there is a wide variation in the speed. Their efficiency at starting is zero and at full speed it is about 80 per cent. If the speed could be constant and high, and without many stops at stations it might be safe to take the efficiency of the motor as high as 85 per cent., but such is not the case, and under the conditions of railroad operations, where the speed of the train varies considerably and there must be stops for stations, signals and water (the Heilmann requires water just the same as the steam locomotive) it is liberal to allow so high an efficiency as 70 per cent. Making this allowance, the coal re quired per horse-power hour, delivered at the axle of the Heilmann motor, is 6.85 pounds. This is to be compared with the 4.73 pounds required by the steam locomotive to get the same amount of power to the same point.

There is, then, a theoretical loss of 45 per cent.; that is the Heilmann motor requires 45 per cent. more fuel to do the same work, making no allowance for the fact that the Heilmann motor will always be about twice as heavy as the steam locomotive for the same service. There is still a further loss, as explained in what precedes, due to the fact that the locomotive boiler would be much less efficient when forced to burn the 45 per cent. more fuel.

Another way to see the deficiency of the Heilmann scheme is to take the relative amounts of fuel required to furnish an indicated horse-power in the cylinders of the steam locomotive and the Willans engine under the given conditions. The relative amounts are 3.84 for the Willans and 4.34 pounds for the steam locomotive: that is, the steam locomotive would require up to the indicated power of the cylinders 13 per cent. more fuel, and there is a further loss in the internal friction of the locomotive of 8 per cent., or a total of 21 per cent. Now the Heilmann motor, to do as well as the steam locomotive, must transmit the indicated power of the cylinders to the axles with a total loss in the internal friction of the engine, the internal friction of the dynamo, the loss in the dynamo, the friction of the motor bearings, and the loss in the motor, not exceeding 21 per cent., which is beyond the limits of possibility under the conditions. If one should go farther and carry out the analysis so as to include the difference in the total weight of the steam locomotive and the Hielmann motor, the showing would be still more unfavorable.

No one who has not examined the details of construction of the Heilmann motor can appreciate the mass of complication of detail. It has all the disadvantages of the hard-driven locomotive boiler, the locomotive running gear, cylinders, electric generating plant, a small steam engine for exciting the field magnets, eight electric motors with their commutators and brushes, eight or sixteen flexible clutches, and eight hollow shafts surrounding the driving axles; in fact it has all the troubles incident to a stationary electric plant, an electric street car and a steam locomotive combined, and has not the advantages of any one of these.

Theoretically it is wrong, practically it is too heavy and complicated.

One thing of importance that has been brought out by the trials of this motor is the inadequacy of the three-phase alternating current system for railroad motors. The able electrician, Mr. C. E. L. Brown, designed a three-phase motor for the Heilmann device but after trial it was found that there was not sufficient starting power and he returned to the plain series motor, which remains to-day the only type suitable for use under the varying speed of railroad service where stops must be made at crossings, for signals and at way stations.

### The Railroad Bond Market for October.

There was a steady improvement in the railroad bond market during the month of October. Every group ad-

vanced, with the exception of those in the hands of Receivers, but the greatest improvement took place after the middle of the month. It was due largely to investment buying, although a number of issues were in considerable speculative demand. The bond market is sufficiently removed from the influence of the speculators to have made its course during the month directly contrary to that of the stock market; prices of nearly all stocks are below those established a month ago, and some have met severe losses. The average advance of the combined list of bonds was .57. The increase in the transactions after the middle of October was at the rate of \$100,000 or more per day. Since the first of November the buying movement has continued, it being largely a reinvestment of interests and dividends paid on that date. The advance by groups and the average is shown in the table herewith:

Granger group adv		ed.	 		٠.	۰	٠	٠		٠	٠.			1.64
Trunk lines group	66													1.13
Southwestern	44											 		.2
Transcontinental	6.6													.57
Coalers	66													.42
Southern	6.6													1.28
Miscellaneous	44													.16

It will be seen that the receivership group was the only one which declined. This was due to weakness in a few leading issues, attributable to specific causes, in conjunction with the comparative inactivity of the majority of the issues. Almost all the Atchison bonds declined heavily, owing to the very bad financial condition of the company, as was disclosed by the report of the expert accountant. The decline in the Atchison 4's from to 65 was significant as reflecting the view held by the investment public of the importance of these disclos-The par value of the bonds (4's) traded in was \$1,-826,000. The Reading issues, which fell off sharply early in the month owing to complications which arose concerning the reorganization, and which began to rally within a week or two, closed, with the exception of the general 4's below the closing September price. The To-ledo, Ann Arbor & North Michigan bonds all appreciated in value, some of them heavily, apparently owing to the victory of the bondholders over the stockholders by uniting on a reorganization plan which treats the bonds much e favorably than any plan heretofore proposed, and h practically wipes out the stock. The disposition which practically wipes out the stock. of speculators toward the receivership issues during the month was to sell rather than buy.

It was in the granger bonds that the tendency of idle capital toward investment was the most clearly marked. High-priced issues were dealt in almost exclusively. The advance of a number has been so great that they are now yielding less than 3 per cent. A feature of this group during the month was Chicago, Burlington & Quincy, Nebraska extension 4's, which closed without net change after transactions of 768,000 shares. Chicago, Rock Island & Pacific extension 5's advanced 2½ points on transactions of over half a million dollars. Northwest issues for the first time in several months were more than usually active, and despite the weakness in the stock, which was accompanied by considerable liquidation, all scored material gains. The advance in the group was greater than that of any others.

The Southwestern bonds had their investment movement checked by the fall in the cotton market. They are more susceptible to speculative conditions than the others, owing to their comparatively low prices and the fact that they are largely held in Wall street circles. An underlying current of strength was the steadily improving earnings which lead to the belief that in an advancing market they will lead the list in point of appreciation.

The coal stocks had a bad time during the month. The decline in various issues in eight days after the 22d was from 2 to 20 points. The bonds, however, yielded only slightly, and on the average actually advanced. This is regarded as evidence that the move in the stock was the result of bear operations, which scared timid holders into liquidation. Jersey Central general 5's, and Lehigh & Wilkesbarre 7's were the only ones to decline; the others advanced.

The substantial improvement in the Southern issues reflects clearly the better condition of the railroads in that section. This is due largely to the Richmond Terminal reorganization and the better feeling which is the result of a determination on the part of the various interests to co-operate in the matter of maintaining rates. There is hardly a bond of the list which is not considered a desirable investment at the price quoted.

The miscellaneous group was very irregular; the average, however, showed slight gain. The Brooklyn and Union Elevated bonds, especially the former, experienced heavy losses, the firsts declining 9%, the seconds 8. Minneapolis & St. Louis issues, owing to a completion of the reorganization, which practically guarantees payment of back interest, advanced sharply. The 2ds appreciated 9 points and the 1sts of the Southwestern Division 7%. Ohio Southern 1sts and 2ds on an advance of 3% and 5 respectively, brought up the general average, and United States Cordage 1sts lost 6% points on steady liquidation which accompanied the decline in the stock. A record of transactions follows:

	Par Value
Atchison 4s	\$1,826,000
Atchison 2nds "A"	
Broadway and 7th Ave. 5s	236,000
Chesapeake & Ohio gen. 41/28	
V. & O. R. & A. 1st 4s	344,000
C. B. & O. Neb. ext	
Chicago, R. I & Pacific ext. 5s	
East Tennessee 5s	
Koncoc & Tevac 4s	

Kansas & Texas 2nds N Y. Chicago & St. L. 4s	529,000 273,000
N. Y. Out. & West ref. 4s Northern Pacific 2nds Northern Pacific 5s	348,000 216,000 537,000
Northern Pacific Col. tr. notes Oregon Short Line 6s Reading Gen. 4s	337,000 826,000
Reading 1st incomes Reading 3rd incomes Rio Grande West. 4s	267,000 278,000
St. Louis Southwestern 1sts St. Louis Southwestern 2nds Texas & Pacific 1sts	221,000 465,000
Texas & Pacific 2nds	1,193,000 652,000 456,000
West Shore guaranteed 4s	235,000

The sales of active bonds during October, par value, are given in a subsequent table.

The Russian Government has made extraordinary efforts to establish the manufacture of locomotives within the empire. Down to 1868 only 217 had been built in the country and none since 1860; while 1,186 had been imported. The establishment of the business may be said to have begun in 1869, when three were built in Russia. In the eight years, 1869 to 1876, the number built in Russia was 794, against 2,174 imported. Down to this time a duty of about 1½ cents per pound was levied. This was raised to 2½ cents for engines and 1½ cents for tenders in 1877, and other increases were made until in 1887 the duties were 4 cents per pound for locomotives and 2 cents for tenders, and further no railroad was permitted to import engines unless it could show that the Russian works were not able to supply them. Under these regulations only 790 locomotives were imported in the 14 years from 1877 to 1891, while 2,595 were supplied by Russian works. In 1891 the duty on tenders was raised to 3½ cents per pound. More than this, the government supported the locomotive works further by giving them orders itself for engines for which it had no need, in order to give them steady work, afterwards selling them to companies which received charters for new railroads. At the same time it paid a premium of \$1,200 to \$1,500 for every locomocive which, Russian works sold to the railroad companies. In spite of all this, only one of five Russian locomotive works has remained continuously in operation. With the revival of railroad construction in Russia the five works are all employed. The largest number built in any one year in Russia was 296. The whole number on the Russian railroads is 7,274, including many very old ones.

Car construction has made more progress than locomotive building in Russia. It is true that out of 7,788 passenger cars in the country at the end of 1891, no less than 5,299 had been imported, but the importations which were never less than a hundred cars a year down to 1878, almost ceased, and in the last ten years were but 33. With freight cars the course of things has been similar, but the home production became important earlier. Duties have been increased, and since 1889 have amounted to \$180 on a box car and \$120 on a flat car. Of the whole stock, only 31 per cent. has been imported, and in the ten years ending with 1891 the importations were but 1,025.

The delivery of Southern railway securities in exchange for the Richmond Terminal certificates began on Monday. The stock is issued in the form of voting trust certificates. There is an authorized issue of \$120,000,000 first consolidated mortgage bonds bearing five per cent. interest. There are also \$4,500,000 East Tennessee reorganization mortgage bonds bearing four per cent. from March 1, 1895, and five per cent. from March 1, 1895, and five per cent. from March 1, 1898. The latter are issued in exchange for the improvement and equipment bonds of the East Tennessee, Virginia & Georgia. Of the Southern Railway consolidations nearly \$22,000,000 will be issued for purposes of reorganization, including \$5,000,000 in cash for adding to and improving the property. Something over \$69,000,000 are reserved to take up underlying bonds on the property owned and leased by the company; \$5,700,000 are to acquire stocks of leased lines; \$3,264,000 to retire equipment liens and \$20,000,000 are reserved for use at the rate of not over \$2,000,000 annually, after Jan. 1, 1896. These bonds are secured by a mortgage on all the lines owned by the company and on its leases, and also by a pledge of a large amount of securities.

In January, 1892, a commission was appointed to report what changes would be necessary to make practicable a complete suspension of freight traffic on Sundays and holidays in the German Empire. The Commission enumerates additions to the force to enable it to do in six days what has heretofore been done in seven; erection of additional employés' houses, additional locomotives, 14,500 additional freight cars; additional tracks for storing the additional cars in dull seasons; additional car rent for interchanged cars, the payment being partly by the day in Germany. The aggregate expenditure is estimated as about \$13,000,000, nearly \$10,000,000 of it for additional cars. The difference would be similar for factories, but it has never been the custom to run factories on Sundays, and the public does not generally appreciate the difference. If factories were run night and day, the same production could! e attained as when they run by day only, with about half the investment of capital for buildings, machinery, etc.; but human beings prefer to rest nights—and Sundays.

Another sign of the upward turn in affairs, which is quite encouraging, is in the reports of the bank clearings

for October. The total as reported by *Bradstreet's*, is the largest for any one month since June, 1893, and the gain over September of this year is 21 per cent., and over October of last year 6.3 per cent. For the first ten months of the year the total is still behind the same period of 1893 and far behind 1892; but the gain in October is enough to be really encouraging.

#### NEW PUBLICATIONS.

Tables and Diagrams for the Use of Engineers and Architects. By William W. Crehore, Assoc. M. Am. Soc. C. E., Civil and Architectural Engineer. Published by the author, 39 Cortlandt street, New York; also for sale by Engineering News, Tribune Building, New York.

Mr. Crehore has compiled and published a set of 15 tables and nine diagrams, the object of which is to enable the computer to take off readily quantities which are frequently needed in structural design. The tables are, generally speaking, in plan such as may be found in various books, some in one book and some in another, but they are as a rule carried out considerably further than the tables of the books. They are blue-printed, each table on a sheet about 10½ x 16½ in., and are easily read, the figures being much larger than one will find in the tables in the books. Each table is accompanied by a note giving a statement of its scope, rules for its use, and examples. The tables are published separately, generally at 25 cents, although some of them are 50 ecnts.

As indicating the scope of the tables we may describe more particularly one or two of them. Table No. 1, for instance, gives required moments of resistance in any rolled shape used as a beam, to sustain a given uniform load per square foot, for spans from 6 to 30 ft. and distances of 3½ to 25 ft. center to center. In this table finding the span at the top of the column and the distance center to center at the left, at the intersection will be found the moment of resistance for a load of 100 lbs. per square foot; for a load from 200 to 300 lbs, the quantity should of course be multiplied by 2 or 3. Then one can find in the handbook of the mills, or in the second table of the author, a beam having as great or greater moment of resistance. Or using the same table, given a certain beam, carrying a certain floor area, to find the number of pounds per square foot it will safely sustain. The moment of resistance may be found in the hand books or in table 2 of the author; then in table No. 1 a coefficient will be found under the given span and opposite the given distance center to center. Dividing the moment of resistance by the number so found the quotient will be the number of pounds per square foot which the floor will sustain.

Table No. 2 gives a comparative list of the principal beams of the four leading mills, Carnegie, Phœnix, Pencoyd and Trenton. This gives R and I and the limiting spans of safe load of these beams. Table No. 4 gives deflections due to maximum safe load for spans from six to 45 ft. and for eight different combinations of the values of the modulus of elasticity and the allowable fiber stress. Each one of these combinations is found on the horizontal line and the span at the head of the column. At the intersection is found the quantity which, divided by the depth in inches, will give the greatest deflection if the beam is symmetrical, and so on. This table will doubtless be found very convenient. Another useful table is No. 12, which gives for wooden stringers and joists the safe uniformly distributed load in pounds per square foot when the distance center to center to known or the distance center to center when a uniformly distributed load is assumed. The table is calculated for spans from six to 30 ft. and 16 different sizes of joists. Another table gives sectional areas in square inches, of square, rectangular and round cast iron columns, varying in diameter from five to 20 inches and in thickness of metal by eighths of an inch from ½ to 3.

These are but a few tables chosen from many as examples. As we said above, there are diagrams covering the same ground as a good many of these tables; but the tables, of course, give more exact values at given intervals. The diagrams have the advantage that they give intermediate values with what is probably practical accuracy.

A good feature of the series is that it is accompanied by an index to problems whose answers may be read from the tables and diagrams. This index gives 67 references from which we may take one or two at tandom: To find the maximum moment on a stringer, having given two Lehigh Valley consolidation locomotives, the same with two Pennsylvania Railroad consolidation locomotives, and the same with two Rogers 35-ton, 4-wheel, tank locomotives. Other problems are maximum shear at end of stringers with the same loads. Most of the values in the table were read from Thacher's calculating machine and it is thought that the results are all sufficiently accurate to be thoroughly practicable.

Steam Tables and Engine Constants.—By Thomas Pray, Jr., C. E. and M. E. New York: D. Van Nostrand & Co. London: E. & F. N. Spon. Price, \$2.00. 85 pages and index.

This volume has the important advantage of containing most of the tables one is liable to need in making calculations on the horse power and efficiency of engines. It has one disadvantage, namely, it requires some search to learn what the numbers referring to title indicate, especially when one only uses such reference books occasionally and in the interim is liable to forget the plan of the tables. If the calculations made for the different tables

are correct, and if the tables may be taken as exact, then this volume contains the best collection of data referring to the measurement of power of steam engines that we have seen in one book; but to those who know how difficult it is to check the large masses of computations which are required to make such tables, and how frequently errors are found in tables that have been used for years, the statement that the computations have been made entirely by the author will not give great confidence, for the reason that an independent set of calculations is not as realiable as one that has been checked, not only by a separate set of calculations, but also by a comparison with the tables of the same kind arranged by other authors. All calculations for tables of this sort should be plotted

All calculations for tables of this sort should be plotted to learn if the results make a smooth curve, for in this way errors can be detected that might escape several independent computers working for the same results.

The need for a new and independent set of calculations which the author mentions in the preface, must be taken with a little allowance, as there were already in existence tables relating especially to saturated steam, that are quite as complete and equally well arranged. The author does not appear to be aware that there are other tables in which the index column is in Fahrenheitic degrees instead of pressures per square inch as is more common. Comparing the tables of the properties of saturated steam with those by Peabody, for instance, we find the Peabody tables are better arranged, as there is an index column at each side of the table which reduces the possibility of errors in reading the tables, and there are also columns of differences which assist materially in the calculation for fractions of a pound and fractions of a degree.

degree.

The table of engine constants in Pray's table is the most complete yet published, and covers a wide range of engines. The author has extended Rankine's table of the ratios of initial and terminal pressures and mean pressures, etc., considerably, but such a table is only applicable to slow-moving engines which give elementary indicator cards, that is, cards without much back pressure or drop during admission, and those who use this table should remember that for this reason it is only suitable for rough approximations, and further for the reason that no allowance is made for re-evaporation during expansion. For accurate work it is necessary to take such data, not from tables, but from the actual indicator cards.

The plan of the work is excellent, as it is the purpose to put in one volume all the reference tables that an engineer is liable to need in calculations on the efficiency of steam engines, and probably the tables are practically correct, for it is not to be supposed that the author has not taken advantage of the work done by others and compared his results with tables published prior to this. Certainly such a comparison is not only legitimate but is desirable, and is a duty which authors of technical books owe to their readers.

Notes on Government Railroads. By Arthur Pew, M. Am. Soc. C. E., M. Inst. C. E. Published by the author at Macon, Ga. Price, 25 cents.

Mr. Pew lives in a State where socialistic theories of railroads are very strong, and his aim in compiling this little pamphlet has been to get together a group of facts which are not obtainable by the mass of the people in his State, and which will be useful to them in forming an intelligent opinion on the subject of government ownership or government control. It has been his purpose to examine the writings of those who are best qualified to speak on the subject, to collect statistics, which have a bearing on the argument and to give references to authorities and source of information. He has inquired into rates and into the amount and quality of service rendered to the public, and made comparisons between the railroad systems, in countries where the roads are controlled by the State, and where they are left with little or no control. His conclusion is that which must be reached by any fair-minded man who really studies the matter, namely, that "in every country where a comparison has been made, including Europe, India, Australia and South America, the official figures tell the same story, that government management is more expensive than private, and cannot give its patrons the efficient service that is rendered by private companies." In the compilation of this pamphlet, Mr. Pew must have rendered a great service to the community for which it is designed.

Cassier's Magazine for November strikes us as being more interesting than usual. Colonel Church has the first of two biographical chapters on John Bricsson. These, we take it, are extracts, or condensations, from some of the chapters of Col. Church's biography of the great engineer. Mr John Birkinbine gives the first of what apparently is intended to be a series of papers on How Iron is Made. Professor Unwin has a paper on Superheated Steam, and Mr. Tweddell a paper on Hydraulic Machine Tools, which ought to be authoritative, for the author has carried this special art to very high perfection. Mr. Spies tells about the first iron casting in America, treating of a casting which was described in the Raitroad Gazette a year or two ago. Another paper, short but of importance, is on Benjamin Huntsman, the Inventor of Crucible Steel, by Mr. R. A. Hadfield, who himself is a high authority. Still another valuable paper is by Mr. H. H. Suplee on the Hydraulic Power Plant of the Niagara Falls Paper Mill.

The Engineering Magazine, November.—The paper which seems to us of the most importance in this issue

of The Engineering Magazine is by Mr. E. L. Corthell on the Advantages of the Tehauntepec Inter-Oceanic Route. Mr. Frank E. Snyder writes on The Great Dam at Austin, Tex. Mr. John Gifford has a paper on the Causes and Effects of Forest Fires; Mr. J. C. Hopkins on the Land of the Mikado; Mr. G. M. R. Twose on Terra Cotta in Modern Buildings. There are still other papers of considerable value. The "departments" have come to be a very important feature of The Engineering Magazine and this worth fill 97 pages. and this month fill 97 pages.

The Stevens Indicator for July.—This issue of the Indicator contains Tests of Automatic Fire Sprinkler Heads, by Professor Jacobus; Test of Insulating Materials for Cold Storage by two students of '93; Test of an Otto Gas Engine by three students of the same class, and a Subject Catalogue of Graduating Theses in the library of the Institute. The period covered by these theses is about 20 years, and in that time a great many very valuable monographs have been accumulated in this department of the library. The catalogue is alphabetical under topics, gives the full title of each thesis, the author and the date. We should suppose that it would be a very use-

#### TRADE CATALOGUES

Interlocking and Block Signaling.—The Johnson Rail-road Signal Co., Rahway, N. J., has issued a very convenient and well designed reference book, 4%x7 inches, giving parts used in interlocking and block signaling. The company will issue shortly a similar book of electrical parts and also a new general catalogue, treating more especially of the science and art of railroad signaling, and showing by diagrams and explanation what it considers the best practice in the various branches of the aft. The book now issued is designed to give to railroad officers who have to deal with signal apparatus, as well as to purchasing agents, a convenient handbook of the Johnson product in this special line. The various parts are shown by engravings on the left hand page, fully and conspicuously numbered, and they are listed on the right hand page, with their names, order numbers and blank columns for prices. The well-known Johnson interlocking machine is shown in all its parts. Then follow ground connections in detail, including selectors and compensators; then signals and signal posts with all their compensators; then signals and signal posts with all their fittings, switch and signal movements, drawbridge connections, and, finally, foundations and signal houses.

Copies of the book will be sent shortly to railroad officers. The price to the general public is \$3.00.

Trucks, Wheels and Other Parts for Electric and Cable Cars. The Peckham Motor Truck and Wheel Co., 26 Cortlandt street, New York.

The Peckham Company issues a handsomely illustrated catalogue, of awkward shape however, being 8½x15½ inches. Of course the saape was chosen in order to show to reasonable scale the engravings of car trucks which appear in considerable detail. Each engraving is accompanied with a short description. The catalogue also shows a track scraper, a wheel and life guard, a self-lubricating journal box, the Peckham improved cushion motor wheels, the Peckham improved motor axles with rigid' collars, and several pictures of cars for various purposes to which these trucks are applied.

The Ludovoici Roofing Tile Company, Chicago, has issued a catalogue describing its interlocking, clay, roofing tile, an article now well known in Germany and Continental Europe, though but recently introduced into the United States. This roof was used on the German Government Building at the World's Fair and since the close of the Fair a company has been organized for its manufacture in this country, with works at Chicago Heights. These tiles are so made as to interlock with one another when laid, and form a very ornamental and durable 100f, as well as one that is practically fire-proof.

he Battle Creek Machinery Company, Battle Creek, Mich., has recently issued a small catalogue describing the Marsh steam pump, a single, direct-acting pump of novel construction, adapted especially for boiler feeding and similar purposes. The steam valve of this pump consists of a single piece working freely within the steam chest, and governed and actuated entirely by steam.

These pumps are extremely simple in construction and would seem to be durable. They are quite extensively used in the West and South.

The Lunkenheimer Specialties .- The Lunkenheimer Co Nos. 11 to 17 East Eighth street, Cincinnati, O., issues its 1895 catalogue, being a handsome pamphlet of 108 pages, 64/x9 in. The catalogue shows parts and appliances for lubrication, valves in great variety, including gate, globe and angle and pop safety valves; cocks for many different services, whistles, water gages and numerous other devices. The illustrations are excellent and price lists and compact descriptions are given.

Modern Methods of Handling Fuel.—The Link-Belt Machinery Co., Chicago.

This above catalogue, which has recently been issued,

This above catalogue, which has recently been issued, is devoted mainly to the illustration of a few of the more recent plants for handling fuel, erected by this company at various points throughout the country. The illustrations include a number of the more important of the locomotive coaling stations, and also several equipments for stationary steam plants. Several views of the shops of the company are also shown.

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#### TECHNICAL.

#### Manufacturing and Business.

Notice is given that the Hamilton Bridge Co., of Hamilton, Ont., has made an assignment for the benefit of creditors. Charles S. Scott, of Hamilton, is Trustee. The assets of the company are stated at \$134,000 and it is claimed a surplus of \$40,000 can be shown. A. P. Wood of Hamilton, who has a claim for \$10,000 initiated the proceedings.

Westinghouse, Church, Kerr & Co., announce the removal of their New England office from 620 Atlantic ave-

nue, to the Exchange Building, 53 State street, Boston.
Mr. Chas. Parsons has been appointed General Western Agent for the Mica Roofing Co., and the Childs Mfg. Co., whose specialties are roofing material for rail-road buildings and cars, and insulating papers and paints. His headquarters will be at Room 500, 112 Dearborn

The Consolidated Car-Heating Co., Albany, N. Y., has awarded the contract for an addition to its factory, which will practically double its capacity. This addition is  $\mathbf{t}_0$  give increased facilities for manufacturing electric heating appliances and the Pope compressed gas lighting ap-

The Manhattan Equipment Co., 115 Broadway, New York, is offering for sale four standard gage coaches. Two of these have 50 ft. 8 in. x 9 ft. 7 in. bodies and the others have 42 ft. x 9 x ft. 5 in. and 42 ft. x 9 ft. 6 in. bodies. They are equipped with the Miller platform and coupler, Westinghouse air-bake and have been thoroughly overhauled.

The Dayton railroad crossing gate is now used to a large extent on many of the larger railroads in this country, and the number of companies purchasing the gate is being so frequently added to that the Craig-Reynolds Foundry Co., manufacturers of the gate, may be soon able to claim that it is used on practically all the prominent railroads in the country. Among the roads recently purchasing the gate are the Pennsylvania Company, the Southern Pacific, the San Antonio & Aransas Pass, and the Western New York & Pennsylvania. The gates have been in use on each of these roads for six months or more, so that the companies have been able to practically test the merits of the gate.

#### New Stations and Shops.

The St. Louis Southwestern is building a new freight and passenger station at Pine Bluff, Ark., to replace the one destroyed by fire a few months ago. The new staton will be ready for use in January.

The freight house of the Southern Railway at Asheville, N. C., which was burned last week, will be rebuilt on an enlarged scale and work has already commenced. The shops of the new Ottawa, Amprior & Parry Sound

Railroad are to be located at Ottawa on a piece of land including about eight acres fronting on Concession street, recently purchased by J. R. Booth.

The shops of the Chesapeake, Ohio & Southwestern, now located at Paducah, Ky., are to be removed to some other town on the road not as yet selected. The receivers have applied to the United States Court, asking the necessary permission for the removal of the shops, which will probably be rebuilt at Louisville, Ky.

# Interlocking.

The National Switch & Signal Co., Easton, Pa., has recently received an order from the Boston, Revere Beach & Lynn Railroad for an interlocking plant of 18 levers to be installed at Orient Heights, near Boston, Mass. This plant will also protect two street crossings.

### Electric Car Heating.

The West End Street Railway of Boston, has ordered 149 cars equipped with the electric heater, manufactured by the Consolidated Car-heating Co., Albany, N. Y.
This is perhaps the most important order yet given in electric heating and was obtained by the Consolidated Company, after tests in competition with other electric

# Ocean Records.

On Friday, Oct. 26, the Cunard Steamship Lucania, arrived off Sandy Hook Lightship, at 3:43 p. m., with a new record for the westward passage. The distance covered was 2,779 knots; daily runs 529, 534, 533, 549, 544 and 90 knots; time, 5 days, 7 hours, 23 minutes, reducing the best previous record made by the same vessel, by 25 minutes. The average hourly speed was 21.81 knots or or 0.08 knots less than her best previous hourly speed going eastward in June last. The best daily run of 549

knots is 11 knots below the previous record.

The American Line steamship New York arrived on the same day in time to land her passengers, having made a passage of 3,051 knots in 6 days, 9 hours, 25

# Car Lighting.

Last week we noted the letting of the contract for light-ing the Brooklyn Bridge cars by electricity. At the same time the Chief Engineer was instructed to report to the Board at its next regular meeting, Nov. 12, on the system, which in his judgement, would be necessary as an auxiliary system, and its cost for 60 cars.

# The Russian Railroad to the White Sea.

The railroad to be built from Wologda to Archangel, on the White Sea, completing a line from Moscow, is to be of 40 in. gage. The estimated cost is \$9,500,000, which is to be provided by bonds guaranteed by the government, which requires the road to be completed by Jan. 1, 1898.

The extraordinary privilege is granted to import the tails and other appliances, which is probably due to the fact that work is to be prosecuted from the Archangel end as well as from the south end, and that Archangel is very difficult of access from any manufacturing district of Russia, but can receive shipments by sea. The government agrees to pay interest on the bonds and sinking fund, to aggregate not more than \$5,000,000 a year, for the first three years, nine-tenths of it the fourth year, and so on, one-tenth less every year until the payment is reduced to three-tenths of the original sum; and it will have the right to build the road after 1906. The Me & Jaroslav Co. undertakes the building of the road.

#### Falling Brake Beams.

A correspondent sends a clipping from a newspaper giv-ing an account of a freight wreck caused by the falling of a brake beam, and says "it is more dangerous to ride on cars equipped with brake beams than to rob a bank."
This is rather an extreme view to take of the relative danger, but it is an unfortunate fact that a great many derailments are caused by fallen brake beams, and a fact that has been recognized by mechanical officers of the railroads for many years. In fact our records of accidents show that of derailments due to defects of equipment about 10 per cent, come from fallen brake beams not pretend to offer a remedy or to say whether it is in a secure hanging of brake beams or in dispensing with them entirely; we merely record the fact.

#### Aluminum in Salt Water.

Recent Washington despatches have mentioned a test o aluminum, just finished by the Navy Department. Two sheets were immersed for three months at the Norfolk Navy Yard; one was of pure aluminum, the other alloyed with a small percentage of nickel. The plate of pure metal was thickly covered with barnacles and more less corroded. The alloyed plate was covered with smaller barnacles and very badly corroded. It is said that the officers of the Navy decided that aluminum could not be used where it would be immersed in salt water for con-

On the other hand, the accounts of the aluminum to pedo boat recently built by Yarrow & Co. for the Freuch Government, say that the tests of the Admiralty were very favorable. Two plates were accurately weighed, then secured to the sides of a wooden, coppered sailing ship, the copper being removed and replaced by the aluminum. This ship made a voyage around the world, then the aluminum plates were removed, weighed and found to have suffered no appreciable loss. Nothing is said, however, about the barnacles.

#### Chignecto Ship Railroad.

In receiving a delegation representing the capitalists interested in this Canadian enterprise the Dominion Minister of Finance stated in London the other day that the Government would give them a definite reply December as to whether or not the time for the completion of the work would be extended. The promoters not having finished their marine railway according to stipulated time have forfeited their claim to the subsidy of \$170,000 voted by the Dominion Parliament for 20 years and they now seek to have this renewed.

### Electric Heaters.

According to the Schweizerische Bauzeitung, the cars of the Mont Saléne electric rack railroad will be heated electrically during the winter season. The heaters for The following data of rack railroads is given, supple-each car consist of two resistance boxes about 30 in, long, menting that given in the Railroad Gazette of Aug. 18,

It will be remembered that a short time since some Manchester merchants wrote to the China Shipowners' Conference expressing the view that the time had come when their consignments to the Far East should be made Manchester docks. The general purport of the replies from the Ocean, the Penins Oriental, the Mogul and the China Steam Navigation Companies was indeterminate, desire being expressed for some assurance that the canal can afford proper accommodation to the steamers, that they will receive sufficient cargo, and that there will be no loss in coming up to Manchester. These communications have been remitted to the shipping Committee of the Manchester Chamber of Commerce. - Transport.

#### Simple and Compound Locomotives.

According to the Austrian Eisenbahn Zeitung, Herr Lochner, of the Royal German Railroad Commission at Erfurt, has carried out a series of trials with two loco-motives of exactly the same design and construction, except that one of them had two equal-sized cylinders, 430 mm. (17.2 in.) in diameter, working as a simple en gine, while the other worked as a compound with a high are cylinder 440 mm. (17.6 in.) and a low-pressure det 660 mm. (26.4 in.) in diameter. The trials showed that the compound locomotives gave better results in point of steam and coal consumption only when the grades and other working conditions permitted of running at speeds of over 40 kilometers (24.8 m.) an hour. With increasing speed there was a steady increase of economy. With speeds below the above figure, on the other hand, the simple locomotive showed the better results. All the working conditions were exactly the same in the two sets of trials, and were considered to be favor able, rather than otherwise, to the compound engine, so that under average conditions the latter would probably have shown a less satisfactory performance. The choice of engine, therefore, whether simple or compound, should, so Herr Lochner concludes, be made to depend largely upon the ruling traffic conditions and character of rvice for which the locomotive is intended.

#### Metal Cross Ties on Swiss Railroads.

According to the Schweizerische Bauzeitung on the five principal Swiss railroad companies, namely, the Central, the St. Gothard, the North Eastern, the Jena-Simplon and the United Swiss roads, the proportions of metal wooden ties are as given in the appended table, which gives also the relative percentages of steel and iron rails in track on those lines:

	C.	St. G.	N. E.	J. S.	U.S.R.
Metal Ties	60.1	57.7	39.8	33.1	17.9
Wooden Ties	39.9	42.3	60.2	66 9	82.1
Steel Rails	65.9	95.1	73.9	72 4	75.7
Iron Rails	34.1	4.9	26.1	27.6	24.3

On the smaller lines metal ties are used less extensively, although on some of them they have found much favor, especially on the various rack railroads, on which employed almost to the exclusion of wooder they are ones.

### Some Foreign Rack Railroad Data.

	Gage,	Length i	in Miles.		Locomotives.					
	Inches.	Rock Section.	Total.	Number.	Weight, Tons.	Tractive Power, Tons.	Weight,			
Puerto Cabello-Valencia, Venezuela Bolan, India	42.7 67 30.4 40 30 42.7 40	2.4 7.2 12.1 23.6 2.25 5.25 5	2,4 ? 42,25 4.7 14,25 12,43?	3 2 8 8 3 4 5	42 54 30 42 16 36	9 12 7 8 5 10 7	60 150 75 60 16 100 20			

12 in, high, and 8 in, wide. Each box contains 42 galvanized iron wire spirals, the total length of wire for each car being about 1,650 ft. The wire is about 0.06 in. in diameter. The current is taken directly from the supply main, and the energy absorbed in the resistance box is equivalent to 15 amperes at 500 volts, or 7,500 watts. The wire reaches a temperature of over 200 degrees Fahr, and heats up the cars comfortably in about 10 or 15 minutes, even on the coldest days. The heaters are placed under the seats at the ends of the cars, and the whole outfit for each car costs about \$12.

# Manchester Ship Canal.

The earnings of the Ship Canal go from bad to worse. Last month's traffic statement is characterized by the same features as the preceding returns-increased tonnage, but a lower rate at which the tonnage was carried. During September the total was 90,243 tons against 83,302 in August, while the revenue was only £5,863 compared with £6,792. The rate per ton earned for merchandise in sea-going vessels actually fell from 1s. 10\(\frac{1}{3}\)d. to 1s. 6\(\frac{1}{3}\)d., a falling off which is very unsatisfactory, more particularly in view of the fact that the rate has steadily declined since the canal was opened. The cause of the decrease last month is due to more low traffic being carried and, with one small exception, the receipts under every class show a falling off

1893. It gives rack railroads of the Abt system and is from the Austrian Eisenbahn Zeitung.

Two of these lines, it will be observed, are rack roads

throughout, while the remaining five are made up of both rack and plain adhesion sections.

# Rails for Canada from Belgium.

The Dominion Government has just closed a contract for rails to be used on the Government railroads. The Cockerill works of Belgium has secured the contract. Cockelli Works of Beginm has secured the contract. The contract is for 4,300 tons to be delivered at Halifax before June, 1895, free of all costs, including freight and insurance. It is understood that the price for the rails is about £4 per ton, About 3,000 tons of the supply will be used on the main line of the Intercolonial Railroad, 1,000 tons on the Prince Edward Island branch and the balance, 300 tons, on the Windsor branch.

# THE SCRAP HEAP.

William Haring, who had both legs cut off in the collision on the Long Island Railroad, June 3, 1893, has received \$28,000 from the road.

The Boston, Revere Beach & Lynn Railroad is to rebuild its terminal at East Boston. The contract calls for the building of ferry-house slips, coal pockets, etc. The ontract has been given to R. W. McIntyre, of Hartford,

The blacksmith shop and round house of the Inter colonial Railway at Riviere du Loup were destroyed by fire recently. In the round-house were 11 locomotives, of which only three could be got out. The fire caught in some old waste in the blacksmith shop, and in half an hour the flames had spread so that nothing could be done to save the property. The loss will exceed \$200,000.

The Western Union Telegraph Co. has just completed the stringing of a new copper wire from New York to San Francisco, and on Sunday a message was sent over it from New York to San Francisco, using but two repeaters. This is the longest distance a message has been sent with but two repetitions, and this will be regularly done hereafter. Heretofore, between New York and San Francisco, a message was repeated four times, and until one year ago five times.

The shops of the Cleveland, Cincinnati, Chicago & St. Louis, at Wabash, Ind., were burned on Oct. 24, including five locomotives and several passenger cars. It is and that the loss is over \$100,000. A freight house and a number of cars belonging to the Southern Railway were burned at Asheville, N. C., on Oct. 27. There was a disastrous explosion of oil in one of the freight cars.

#### The New Central Station at Lisbon.

The New Central Station at Lisbon.

Recent numbers of Engineering (London) described with engravings a new central railroad station built at Lisbon. Heretofore the railroads running into Lisbon have had two termini, at the extreme east and extrem. West of the city, and both remote from business centers. The Royal Railroad Co. has brought all of these railroade to a common junction, whence they are carried into the central station now built. As the city is very hilly, a tunnel 2,843 yards long had to be built, with a grade of 1 per cent., connecting the station with the junction. This tunnel will be worked by special locomotives similar to those used on the Metropolitan Lines of London. The mouth of the tunnel toward the station was widened to permit the principal switches for the lines running into the station to be placed within the tunnel itself. The normal tunnel is 26 ft. wide, semi-circular in section. It was built within 20 months, six shafts having been sunk to give additional working places. The site of the station is 47½ ft. above the main street level, and is approached by a zigzag drive. The station is provided with hydraulic apparatus working a transfer table for locomotives and turn-tables for cars as well as lifts for passengers and baggage. The hydraulic apparatus was supplied by Mr. H. J. Coles, of Southwark, and Messrs. Cowan & Sheldon, of Glasgow, and installed by Mr. A. G. White, an English engineer. The contract for building the station and tunnel was taken by a French firm and executed under the superintendence of the engineers of the rail-road company. road company.

#### University of Illinois.

The formal dedication of the new Engineering Hall of the University of Illinois at Champaign will take place at 7.30 P. M., Nov. 15. On the same day the inaugura-tion of President Andrew S. Draper will also be formally

# Freight Shipments on the Great Lakes.

It expected that the shipping season for ore will close about Nov. 15, while other freight will be well out of the way by the same date. At the close of navigation there will have been carried down the lakes over 7,000,000 tons for the year, of which all but about 1,600,000 tons will have come from Lake Superior ports, and 2,700,000 tons from Duluth, at the western extremity of the lakes. Duluth last year shipped only 1,540,000 tons, which was far in excess of any preceding year. It is now estimated that this port will next season ship not less than 4,500,000 tons, or fully half the ore of the Lake Superior region.

Two million tons of anthracite coal have been shipped to the upper lakes from Buffalo this season so far, and the business is about over. The Lake Erie ports have sent up the lakes not far from 4,000,000 tons of soft coal.

The Chicago & Northwestern road has shipped ore this year to Ashland, aggregating 1,100,000 tons; to Escanaba, 1,500,000 tons. The Wisconsin Central has shipped 650,000 tons; the Duluth, South Shore & Atlantic, 1,100,000 tons; the Duluth & Iron Range, 1,400,000 tons; and the Duluth, Missabe & Northern, 1,300,000 tons.

Three thousand tons of iron ore was loaded on a vessel at Two Harbors, Minn., the other day in 45 minutes.

A contract for removing 300,000 yaids of earth from over the ore body at the Mahoning Ore Co.'s mine on the Mesaba range was let last week to Winston Bros. & Dear, old railroad contractors, for about 30 cents a yard. They are to have the work completed in season to allow the mining company to ship 400,000 tons in 1895. The Duluth, Mississippi River & Northern road, which is to handle this ore, is making extensive improvements to its equipment and facilities.

### The Macdonald Prize at the R. P. I.

The Macdonald prize for the class of 1894 will be conferred upon Paul Lyon Reed, of Denver, Co. The subject of his thesis is "Design for a Hydraulic and Electric Plant." Mr. Macdonald in stating his decision as to the award of the prize speaks of the thesis as a very creditable work indeed. In fact he says that the writer has treated the subject in a masterly manner.

# Train Robbers Punished.

Train Robbers Punished.

The public is fully informed by the newspapers when a train robbery occurs, but the history of the sequel is not always as widely disseminated. In one of the cases which occurred on the Savannah, Florida & Western, the robbers were followed and every man in the gang was shot. There have been three train robberies on the Illinois Central within a few years and every one of the parties connected therewith has been arrested, convicted and sentenced to terms of from five to twenty-one years. The men who were engaged in the recent train robbery near Aquia Creek on the Richmond, Fredericksburg & Potomac have been arrested, and one of them has confessed the crime. The stolen express pouch has been recovered. This prompt and determined action in following the robbers is deserving of high praise. \* \* —Official Guide,

#### LOCOMOTIVE BUILDING.

Three new and heavy locomotives have been added the rolling stock of the Intercolonial Railroad and it said that the Canadian Government intends to renew a the locomotives on the line, and to replace them by ne engines for which Parliament will probably be asked to make an appropriation next session.

#### CAR BUILDING.

The Youngstown Car Co., has contracted to build 200 coke cars for the Pittsburg & Lake Erie. The Simons improved drop door has been specified.

The Southern Railway Co., has given an order to the Lenoir Car Works, of Lenoir City, Tenn., for 250 hopper bottom coal cars of 60,000 lbs. capacity.

#### BRIDGE BUILDING.

Doylestown, Pa.—The County Commissioners last week received proposals for the building of Geddes Run bridge. There were eight bidders, but the bids of the King Bridge Co. and the Massalon Bridge Co. were not received because no check accompanied the bid as required. The bidders for the superstructure were: Dean & Westbrook, \$2,500; Groton Bridge Co., \$2,348; New Jersey Steel &Iron Co., \$2,375; Nelson & Buchanan, \$2,300; Penn Bridge Co., \$2,303; Wrought Iron Bridge Co., \$2,600. The contract was awarded to Nelson & Buchanan. o., i

Buchanan.

East Hannibal, III.—The bridge to be built over the Sny Levee in Pike County, Illinois, is to be of steel and will consist of five spans. The end spans will each be 45 ft.; the center span 140 ft., and the two intermediate spans 70 ft. each.

There will be stone abutments at each end, and the next two piers from the shore are to be 3-ft. steel cylinders filled with concrete. The two center piers will be 4-ft. steel cylinders filled with concrete as the others. The bridge is to be completed by Jan. 15, 1895, and it will cost \$5,600.

Eldred, Pa.—The County Court has made an order approving the petition for a bridge across Knapp's Creek, in Eldred township, the county's share of cost to be \$1,500.

\$1,500.

Hull, Que.—Messrs. Viau & Lachance, have been awarded the contract by the Dominion Government for erecting a bridge over Pond Creek.

Montreal.—The corporation of this city are calling for ten ders, to be received up to Nov. 21, for the steel superstructure and trestle bents for a bridge over the Canadian Pacific Railroad tracks on Notre Dame street. Forms of tender with views of plans can be obtained from the City Surveyor.

Surveyor.

Providence, R. I.—The contract for the abutments of the so-called Red Bridge has been let to John T. Tank. The contract price is \$23,210. The following bids were received: F. E. Shaw, \$25,391; Everson & Liddell, \$27,-064; John T. Tank, \$23,210; J. A. Darley & Son, \$26,910; Joseph B. Pettley & Son, Woonsocket, \$26,854; Joseph Ross, Ipswich, Mass., \$29,412. The specifications call for repairs on the present piers to strengthen them, while the smaller piers will be entirely rebuilt. The work will be completed next summer.

St. Stephens, N. B.—At a meeting of the Dominion Cabinet last week it was decided to admit free of duty any material entering into the construction of the proposed International Bridge across the St. Croix River between St. Stephens, N. B., and Calais, Me., conditionally that the United States Government make a like concession in regard to material obtained in Canada which may be used at the American end of the bridge.

West Chester, Pa.—John Denithorne & Son, of Phænixville, Pa., have received the contract for the building of an iron bridge over Buck Run, in Marlborough Township.

# MEETINGS AND ANNOUNCEMENTS.

Dividends.
Dividends on the capital stocks of railroad companies have been declared as follows:

have been declared as follows:

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Port Royal & Augusta, annual, Augusta, Ga., Nov. 20. South Carolina & Georgia, annual, Charleston, S. C.,

. 14. ennsylvania, semi-annual, 2½ per cent., payable Nov. 30. ome. Watertown & Ogdenburgs. 1½ per cent., payable Rome, Water word .

Nov. 15.

New York, Pennsylvania & Ohio. annual, Cleveland, O.,

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

technical societies will be held as follows:

The New York Railroad Club meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The New England Railroad Club meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The Central Railway Club meets at the Hotel Iroquois, Buffalo, N. Y.. on the fourth Wednesday of January, March, April, September and October, at 10 a. m.

The Southern and Southwestern Railway Club meet at the Kimball House, Atlanta, Ga., on the third Thurs day in January, April, August and November.

The Northwestern Railroad Club meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. in.

Hotel, St. Fant, on the second Tuesday of each month, at 8 p. m.

The Northwestern Track and Bridge Association meets at the St. Paul Union Station, on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The American Society of Civil Engineers meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The Western Society of Engineers meets on the first Wednesday in each month, at 8 p. m. The headquarters of the society are at 51 Lakeside Building, Chicago.

The Engineers' Club of Philadelphia meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The Engineers' and Architects' Club of Louisville meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday in each month, at 8 p. m.

The Association of Engineers of Virginia holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The Boston Society of Civil Engineers meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p.m.

The Engineers' Club of St. Louis meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The Engineering Association of the South meets on

and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The Engineering Association of the South meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The Engineers' Society of Western Pennsylvania meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7:30 p. m.

The Technical Society of the Pacific Coast meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The Denver Society of Civil Engineers meets at 36 Jacobson Block, Denver, Col., on the second and fnorth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

only.

The Montana Society of Civil Engineers meets at Helena, Mont., on the third Saturday in each month, at

The Engineers' Club of Minneapolis meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The Canadian Society of Civil Engineers meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alter-

The Canadian Society of rooms, 112 Mansfield street, Montreal, P. Q., every and rooms, 112 Mansfield street, Montreal, P. Q., every and the third street and the third street and the case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month. The Engineers' Club of Cincinnati meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7:36 p. m. Address P. O. Box 333.

The Foundrymen's Association meets at the Manufacturers' Club, Philadelphia, Pa., on the first Wednesday in each month.

The Western Foundrymen's Association meets in room

each month.

The Western Foundrymen's Association meets in room 701, Western Union Building, Chicago, on the third Wednesday of each month. B. W. Gardner, Monadnock Block, Chicago, is secretary of the association.

The Association of Civil Engineers of Cornell University meets on Friday of each week at 2:30 p. m., from October to May inclusive, at their Association Rooms in Lincoln Hall, Ithaca. N. Y.

Boston Society of Civil Engineers.

A regular meeting of the Boston Society of Civil Engineers was held at its rooms, 36 Bromfield street, Boston, on Oct. 17, 1894, at 7.50 o'clock p. m., President W. E. McClintock in the chair, 76 members and visitors

present.

Mr. Walter C. Sievens, of Melrose, Mass., was elected a member of the society. The thanks of the society were voted to the Boston Water Board for its kindness in furnishing railroad transportation on the occasion of the visit of the members of the Society to Basin 5 on Sept. 26,

1894.

The Secretary read a circular letter from Mr. E. L. Corthell submitting a proposition for the organization of an International Institute of Engineers and Architects. On motion of Mr. Noyes the communication was referred to the Board of Government.

Mr. Spencer Miller, Chief Engineer of the Lidgerwood Mfg. Co. was then introduced and read a very interesting paper on Cableways. The paper was fully illustrated by a large number of stereopticon views.

American Society of Civil Engineers.

American Society of Civil Engineers.

At the meeting of Nov. 7 a paper was presented from Mr J. A. I. Waddell on the Halsted street lift bridge in Chicago. This bridge has been so fully described by the Railroad Gazette and in other journals that we do not need to make any abstract of the paper at this time.

At the meeting of Nov. 21 Mr Cope Whitehouse will give a lecture on the "Proposed Reservoirs for the Storage of the Surplus Flood Waters of the Nile," which will be illustrated by lantern slides, showing the plans submitted to Sir Benjamin Baker and the other commissioners.

mitted to Sir Benjamin Baker and the other commissioners.

The Bulletin of Nov 2 opens with a plea for more papers and more discussions of the papers by members.

The following committee is announced to award the Norman Medal: G. F. Swain, Arthur Pew and John C.

Chase.

The committee announced to award the Rowland Prize is Robert Cartwright, Schuyler S. Wheeler and the Secretary of the Society.

Association of Engineers of Virginia.

Association of Engineers of Virginia.

At the regular monthly meeting of this Association, held in Roanoke, Va, Oct 16, the papers prepared to be read before the "Good Roads Convention," meeting in Richmond, Oct. 18, by Mr. C. C Wentworth on "Country Road Bridges," and by Mr Clarence Coleman on "What Bad Roads Cost," were read and discussed. Mr. Wentworth's paper brought out much information of great value to those who have to do with the keeping up of the highways of the State.

Mr. Coleman's paper showed clearly what a great cost to the State her bad roads were, and the fact that this large sum was paid without being appreciated because it was paid indirectly.

The regular fall meeting of the Association will be held in Roanoke on Nov. 17, at 4 p. m., at which time there will probably be a paper by Mr. I. E. M. Hanckel on "The Improvement of Roads in Knox County, Tennessee, and Fulton County, Georgia," and a paper by Mr. H. A. Gillis, "Notes on Steel."

# PERSONAL.

—Mr. R. T. Goff, formerly Acting Superintendent, has been appointed Superintendent in charge of the Operating Department of the Jacksonville, St. Augustine & Indian River road, and of the Atlantic & Western.

—Mr. Henry A. Williams has resigned his position as Master of Trains with the Southern Railway and has been appointed Master of Trains on the Florida Central & Peninsula Railroad, with headquarters at Savannah, Ga. Mr. Frank Holland has taken the position with the Southern Railway made vacant by the resignation of Mr. Williams.

wiffiams.

—Mr. G. B. Nickerson, Chief Engineer of the Queen & Crescent Line, has prepared plans for a new passenger station in New Orleans in place of the structure burned some months ago. The building will be of brick, two stories in height, and located on the site of the old building, but of larger dimensions. The local offices will be located in the second story.

—M. John B. Taylor, Division Freight Agent of the Pennsylvania at Baltimore. Md., has been appointed

Assistant General Freight Agent, with headquarters in Philadelphia. The office is a new one, created to divide the duties now assigned to Assistant General Freight Agent C. A. Chipley. The latter will retain charge of the local business, while Mr. Thayer will look after the through traffic.

—The death of Milo W. Locke, a well-known contractor of Baltimore, Md., is announced from Palatka, Fla. Mr. Locke constructed the Delaware Breakwater, at Lewes, Del., and built the Baltimore & Ohio bridge over the Brandywine River, near Wilmington, Del. He was a member of the contracting firm of I. H. Jlathaway & Co., of Philadelphia, and superintended the jettying of the St. Johns River at Mayport, Fla.

—Mr. Lames P. E. Kelly M. E. and Mr. Contage.

St. Johns River at Mayport, Fla.

—Mr. James R. F. Kelly, M. E., and Mr. Gustave Triest, C. E., Jun. Am. Soc. C. E., have formed a partnership under the name of J. R. F. Kelly & Co., engineers and contractors, with offices in the Havemeyer Building, New York city. Mr. Kelly has until recently been pattner of Joseph Edwards & Co., machinists, New York, and Mr. Triest has been assistant to Mr. Alfred P. Boller, M. Am. Soc. C. E., for the past five years.

—Mr. R. C. Wright has opened an office as mechanical expert and solicitor of patents at 906 Walnut street, Philadelphia. He will devote himself to special work in the line of steam engineering, locomotive and car construction, wood and iron working, and hoisting machinery. Mr. Wright has had a long and valuable experience in railroad mechanical work. He has associated with him Mr. F. E. Stebbins, of Washington, for eight years examiner in the United States Patent Office.

—William F. Kornegay, President of the North

iner in the United States Patent Office.

—William F. Kornegay, President of the North Carolina Railroad Co., dropped dead in church at Goldsboro, N. C., at his home. Nov. 1. He became President of the North Carolina Railroad three years ago, upon the election of his predecessor, Thomas M. Holt, as Governor of North Carolina. The State of North Carolina is the principal owner of the road, and the Directors appointed by the Governor will control the election of his successor. The road is operated by the Southern Railway under a lease.

lease.

—Mr. V. G. Bogue has been employed to prepare a general plan for a Union Terminal at Seattle, Wash., to be used by the Great Northern and Northern Pacific Railroads. He is also to design a street and dockage system, which it is proposed to lay out on the Tide Flats and water front of that city. The plans are to be accompanied by a full report. This work is being done for the Board of Tide Land Appraisers, under an act of the Legislature. Mr. Bogue has an office in the Rialto Building, Chicago.

—Mr. Charles A. Sheldon who recently resigned as

Mr. Bogue has an office in the Rialto Building, Chicago.

-Mr. Charles A. Sheldon, who recently resigned as Assistant Division Superintendent on the Michigan Division of the Lake Shore & Michigan Southern Railroad, has accepted a position with the Consolidated Car-Heating Co., of Albany. N. Y. He will have charge of the compressed gas lighting department of that company, and will further the introduction of the Pope gas system. Mr. Sheldon is a graduate of Yale, Class of 1890, and has been with the Lake Shore Road four years, having risen through several grades to the position of Assistant Division Superintendent.

-Mr. W. H. Jagues, formerly of the United States

Division Superintendent.

—Mr. W. H. Jaques, formerly of the United States Navy, and more recently of the Bethlehem Iron Co., has been decorated with the order of the Rising Sun of Japan. This is in recognition of his services to the Japanese Government in advice and consultation with its officers, especially in the matters of armor and ordnance. In following out its fixed and very intelligent policy the Japanese Government has sent to the western nations for years the pick of its young men to learn by their own observation what those nations are doing in all matters of material progress, and it has been Mr. Jaques' fortune to render valuable aid to those young men many times in the past. Perhaps it is not too much to say that he has been one of the many influences that have conspired to enable the Japanese to thrash the Chinese so suddenly and neatly.

—Mr. Edward McIntyre, the Countraller of the Central

suddenly and neatly.

—Mr. Edward McIntyre, the Comptroller of the Central of Georgia Railroad, has tendered his resignation to Receiver Comer on account of failing health. He recently resumed his duties after a long vacation, much improved in health. but confinement to his office has had a bad effect and his physicians have advised him to give up business matters. He has been in the service of the Central of Georgia quite 35 years, his service being continuous except for a few months, when the road was leased to the Richmond & Danville Railroad. He has been an officer of high character and integrity and leaves railroad work with the good will of his company and of the community in which he has resided. Receiver Comer informally accepting his resignation has expressed regret that he feels obliged to leave the service of the company and commends him for the faithful and able manner in which he has performed much arduous work while he has held the position, and particularly for the last two years, during the receivership.

—Mr. George A. Haggerty has resigned his position as

work while he has held the position, and particularly for the last two years, during the receivership.

—Mr. George A. Haggerty has resigned his position as Master Mechanic of the Atlantic Division of the Canadian Pacific Railroad, and for the present is residing at Southbridge, Mass. Mr. Haggerty has held the position of Division Master Mechanic on the Canadian Pacific since that company took over the lines of the New Brunswick Railroad. He was then in charge of the Mechanical Department of that company, having been its mechanical superintendent since 1885. Mr. Haggerty is a well informed and energete officer. His experience in the mechanical department has been a long one, and has included service in many parts of this country. He was for some time Superintendent of Motive Power of the Chesapeake, Ohio & Southwestern and for several years was Superintendent of Motive Power of the Texas & Pacific. On the New Brunswick Railroad he had a poor railroad, with insufficient equipment, and with inadequate shops and tools, to keep up repairs. By good and resourceful management he has been able to keep the motive power up to a surprisingly high standard of efficiency.

—The appointment of Mr. Frederick Danforth, of Cardwer Mer to be State Beilread Commissioner.

—The appointment of Mr. Frederick Danforth, of Gardner, Me., to be State Railroad Commissioner of Maine, was briefly noted last week. Mr. Danforth succeeds Colonel Wildes, who was a member of the Commission for very many years, and was the civil engineer of the board. Mr. Danforth is a graduate of Dartsmouth College, and has practiced his profession since 1870. He is the son of Judge Darforth, formerly a Judge of the Supreme Court of Maine. Mr. Danforth is admirably qualified for the position to which he has been appointed, both by reason of his experience as a locating and constructing engineer and by personal characteristics. His work as an engineer has made him familiar with practically all the railroads in Maine. He was employed in the construction of the European & North American Road, now part of the Canadian Pacific, on the Portland & Ogdensburgh under John A. Anderson, formerly Railroad Commissioner of Maine, and has been

Chief Engineer of the Portland & Rumford Falls and a in charge of the construction of other short railroads, constructed in Maine during late years.

in charge of the construction of other short railroads, constructed in Maine during late years.

—Mr. Charles H. Schlacks, who has been Superintendent of Machinery of the Denver & Rio Grande Railroad since last December, has been appointed Assistant General Manager of that company. The circular announcing his appointment does not define his specific duties. Mr. Schlacks was formerly Superintendent of machinery on the Illinois Central Railroad for 10 years until the early part of 1893. When he resigned he had completed nearly 40 years of continuous service with the Illinois Central Railroad. It is interesting that both Mr. Jeffery, now President of the Denver & Rio Grande Railroad, and Mr. Schlacks are of about the same age, both born in foreign countries, both began service on the Illinois Central about the same yearas boys, and grew up in that company's service in the mechanical department, beginning at the lowest round. Mr. Jeffery was transferred to the operating department and became General Superintendent and General Manager, Mr. Schlacks' continuing throughout in the mechanical department, serving as superintendent of machinery for 10 years, Mr. Jeffery being then General Manager of the company. This is the second instance in which Mr. Jeffery has made an appointment to the operating department. Soon after his election as President of the company he promoted Mr. N. W. Sample, then superintendent of machinery, to be General Superintendent.

#### ELECTIONS AND APPOINTMENTS.

Binghamton & State Line.—The annual meeting of the Directors was held at Binghamton, N. Y., last week. The following Board of Directors was elected: Senator Edmund O'Connor, Edward E. Kattell, C. M. Dickinson, Walter P. Pratt, Harry C. Ross, Rollin Meeker, W. S. Brandt, Frederick E. Ross and G. C. Bayless, in place of Joseph P. Noyes.

Buffalo & Susquehanna.—W. D. Huntington, of Larabees, Pa., has been made Chief Train Dispatcher.

Cleveland, Cincinnati, Chicago & St. Louis.—At the annual election of the stockholders at Cincinnati, on Oct. 31, the following were unanimously chosen as Directors: Cornelius Vanderbitt, William K. Vanderbitt, Chauncey M. Depew, J. P. Morgan and M. E. Ingalls. The Directors elected constitute one-third of the Board and are to serve three years.

Kansas City, Osceola & Southern.—Leslie McLachlin has been appointed master mechanic, with headquarters at Clinton, Mo., in charge of the machinery and car departments. Mr. McLachlin was formerly connected with the Wabash.

the Wabash.

Los Angeles, San Francisco & Salt Lake.—The following is a list of the incorporators of this company, whose incorporation in California was recently noted: John M. C. Marble, Jefferson Chandler, Shirley C. Ward, C. W. Rogers and T. B. Burnett, all of Los Angeles, Cal., and C. U. Stuart and Arthur Young, of Chicago.

Mexican Central.—E. A. White having resigned as General Passenger Agent, Mr. Adam Hoffman has assumed the duties of that office in connection with the position of General Freight Agent, the two departments being consolidated. Mr. White has been in the employ of the company for seven years, having entered the service as Chief Clerk.

Minneapolis & St. Louis.—The reorganization of the

of the company for seven years, having entered the service as Chief Clerk.

Minneapolis & St. Louis.—The reorganization of the railroad has been completed and the officers elected are W. L. Bull, New York, President; Edwin Hawley, New York, Vice President; Richard B. Hartshorne. Treasurer; Joseph Caskell. Minneapolis, Secretary and Assistant Treasurer; William Strauss, New York, General Counsel; A. E. Clark, General Solicitor; A. L. Mohler, Minneapolis, General Manager.

New York, Loke Erie & Western.—C. W. Buchholz has been appointed Chief Engineer, with office at 21 Cortland street, New York, vice A. Mordecai, transferred to be Assistant Chief Engineer, with office at Cleveland, O. The office of General Roadmaster of the N. Y., P. & O. R., R. Division has been abolished.

Pittsburg, Cincinnati, Chicago, & St. Louis.—M. L.

Pittsburg, Cincinnati, Chicago, & St. Louis,—M. L. Ryers, Engineer of Maintenance of Way of the Indianapolis Division, has been transferred to the Chicago Division, W. C. Loree returning to the Indianapolis Division.

Division, W. C. Loree returning to the Indianapolis Division.

Staten Island Rapid Transit.—Mr. F. S. Gannon, General Superintendent of the railroad, announces the appointment of W. O. Sprigg as Superintendent, with headquarters at St. George, S. I. Mr. Sprigg formerly held the office of Master of Transportation, which position is now abolished.

Union Pacific, Denver & Gulf.—H. H. Smith has been appointed Assistant General Freight Agent, with headquarters at Denver. Mr. Smith was formerly Chief Clerk in the office of General Freight Agent Wild at Denver. Vasoo & Mississippi Valley.—C. A. Moreno has been appointed Roadmaster of the Vicksburg Division of the railroad, to succeed J. C. Hutchins, recently resigned. Mr. Moreno has been in the service of the company 10 years. He is about 30 years of age, and prior to his appointment had been Assistant Roadmaster.

#### **RAILROAD CONSTRUCTION.** Incorporations, Surveys, Etc.

Binghamton & State Line.—The grading is reported completed south of Binghamton, N. Y., for the first five miles. The survey for the next 15 miles has been made and work is being pushed ahead. The rails have already been contracted for, but no track will be laid until 10 miles have been graded. As the winter is now so near at hand, the probability is that the work of laying the track will not begin till next spring. The railroad will extend from Binghamton to the State line, and from there to Williamsport, Pa., will be known as the Pennsylvania & Southern Railroad. The names of the directors are given in another column.

in another column.

Blue Mountain.—The engineers have made the final location between Reading and Strausstown, a distance of 19 miles, and the preliminary survey between Strausstown, Berks County, Pa., and Slatington, Lebigh County, at the junction with the Pennsylvania, Poughkeepsie & Boston road, a distance of 41 miles, and they expect to report a final location within a month. They will then proceed from Strausstown west to Singlestown, Dauphin County, a distance of 34 miles, to Stakeoff; then from Singlestown to Harrisburg, a distance of 8 miles will be finally located. As soon as the reports of the engineers are made, the company will be prepared to receive bids for constructing the road. The office is at 926 Walnut street, Philadelphia.

Burlington & Missouri River.—The extension of this line into Montana was opened for regular traffic on Oct. 28. This extension is a continuation of the line which has been built through Wyoming in the last few years and had reached Sheridan in the northwestern part of that State in December last. That town is a short distance south of the Montana line. After crossing the State line the extension goes through the Crow Indian Reservation and makes a connection with the Northern Pacific at Huntley, a station near Billings, Mont. The distance over the Burlington line from Omaha to Helena is 1,131 miles, this being about 295 miles shorter than by any other route. The length of the new line built this year is about 125 miles.

Canadian Roads—Notice is given that application will be made to the Dominion Parliament next session for a charter to construct a line, operated by either steam or electricity, from Ottawa to Brockville, Ont., to connect at that point by bridge or ferry with the railroads of the United States.

Chattanooga Southern.—The Chattanooga Southern

Chattanooga Southern.—The Chattanooga Southern is building a branch line from Blue Pond, Ala., to Round Mountain furnace, on the Coosa River, a distance of 5 miles. H. L. Woolf, of Anniston, Ala., is superintending the work.

ing the work.

Cheat River.—Last week a party of engineers in the employ of this company, which was chartered in Pennsylvania some months ago to build a railroad up the Cheat River in West Virginia and which has its headquarters in Pittsburgh, began work at Point Marion, Pa. They are unning lines up the south side of the river, and will follow that side of the stream for 14 miles, and crossing will follow the other bank a distance of 18 miles, to the mouth of Sandy Creek. The road as proposed will join the Baltimore & Ohio at Point Marion. It is to develop coal, timber and iron ore.

Chicago. Paducah & Memphis.—The contractors are

coal, timber and iron ore.

Chicago, Paducah & Memphis.—The contractors are preparing to undertake immediately the completion of the Northern Division of this railroad, which is already completed between Mt. Vernon and Marion, Ill., about 40 miles. The grading has been completed and everything is ready to go ahead with the tracklaying as soon as the rails have been delivered. These have been purchased and are expected to arrive on the line about Nov. 10, when the tracklaying will be started. The Northern Division is from St. Elmo, a station just west of Altamont on the Wabash Railroad, and will be about 50 miles long to Mt. Vernon, where it will connect with the portion of the railroad already built.

Cincinnati. Jackson & Mackinaw.—The business

portion of the railroad already built.

Cincinnati, Jackson & Mackinaw.—The business men of Jackson, Mich., have appointed a committee to consider a proposition made by General Manager F. B. Drake, of the iailroad, looking to the extension of the live from Addison, Hillsdale County, north to Jackson, to connect with the Grand Trurk. Mr. Drake's proposition is that if the people of Jackson secure the right of way from Addison to the Michigan Central track south or east of Jackson the railroad company will commence the construction of the line.

from Addison to the Michigan Central track south of East of Jackson the railroad company will commence the construction of the line.

Cleveland, Lorain & Wheeling.—The track laying on the Cleveland extension of this railroad has been going on for some months and has now been finished for over half the distance between the old terminus at Lester and the new terminus in the city of Cleveland. All the work is likely to be completed within a month's time. There are about a dozen bridge spans along the new road and the election of the work has been the chief cause of the delay in completing the tracklaying. The road has been built under the supervision of the Chief Engineer of the railroad, Mr. W. C. Jewett.

Coast of Nova Scotia.—The contract between the Nova Scotia Government and the Coast Railway Co. for the construction of a narrow gage railroad from Yarmouth to Shelburne and Lockport, on the south coast, has been formally ratified and signed.

Columbus, Hocking Valley & Athens.—The surveys for this project, which is to follow the Hocking Valley Canal bank through Ohio, are now nearly completed. These surveys were begun early in the summer immediately after the passage by the State Legislature of the law authorizing the company to use the canal bank as a railroad bed under a lease from the state, which as a railroad bed under a lease from the state, which receives a certain annual rental. The surveys have been under the direction of W. H. Jennings from Columbus as far as Athens, about 70 miles. The actual work of construction is to begin during the present month.

Denver, Lakewood & Colden.—The officers announce that the line will be in operation as far as Ralston, over the newly completed extension this week. This extension reaches to a point eight miles beyond Golden, Col.

Duluth, Missabe & Northern.—M. J. Peppard and

Duluth, Missabe & Northern.—M. J. Peppard and C. Johnson, of Virginia, Minn., have the contract for building five miles of branches from Weimer Station to the new town site of Eveleth, in Northern Minnesota, about 10 miles.

Intercolonial.—The Dominion Government is now preparing plans upon which to invite offers for the construction of some 13 miles of railroad to connect Dartmouth, N. S., near Halifax, with the Intercolonial by means of a line around the Basin at Halifax, in lieu of the bridge carried away last year. Tenders for the construction of this branch will shortly be called for by the department.

struction of this branch will shortly be called for by the department.

Kansas City, Shreveport & Gulf.—The officers report that the contract has been let to the firm of Monroe, Strang, Lee & Co., of Lawrence, Kan., for building the line through Northern Louisiana to reach Shreveport in that State. The charter for this company was secured a few months ago by the directors of the Kansas City, Pittsburgh & Gulf. The new line is to be an extension of the Texarkana & Fort Smith load which is now controlled by the Kansas City, Pittsburgh & Gulf. The extension is to be from Texarkana to Shreveport, La., about 70 miles. The officers of the three companies are practically identical and the control of the corporations is held in Philadelphia. F. B. Hubbell, the Secretary of the Texarakana & Fort Smith, is now making his headquarters at Shreveport, La., directing the affairs of the new company.

company.

Mexico, Cuernavaca Pacific.—The Mexican Government has approved the location of the line to Acapulco, on the Pacific Coast, a distance of about 175 miles from Cuernavaca. The route surveyed will open up the rich States of Morelos and Guerrero, the latter being especially a mineral region with gold mines in operation. Grading on the line from the City of Mexico to Cuernavaca has been resumed, having been suspended during the height of the rainy season. About 40 miles of this line is now in operation. operation.

operation.

Maxican Roads.—Work on the road from Tecolutla to Espinol. Mex., is being pushed rapidly forward. Two stations have been built; one at Tecolula, and the other at San Pablo, and the track laid beyond kilometre 22. The rolling stock includes two locomotives, two coaches and

several box and flat cars. The road will be open to the public, from Tecolutla to San Pablo, as soon as it is inspected and approved by the Government.

inspected and approved by the Government.

Montford Colonization.—This road was formally opened last week. It is a narrow gage line built through a mountainous part of Quebec with many engineering difficulties to overcome. The distance is 21 miles from St. Sauveur to Montford, but next year the road will probably reach Arundel, 12 miles beyond, making the total length 33 miles. E. Senecal, of Montreal is President.

New Roads.—William Cummins, of New Orleans, who is connected with the Yazoo & Mississippi Valley, has been awarded the contract for building a line of road upon several sugar plantatious on the line of the Valley branch. The line is intended to facilitate the handling of sugar cane, which is transported by the Valley branch of the Illinois Central.

Nippenose Valley.—A party of engineers and a local

of the Illinois Central.

Nippenose Valley.—A party of engineers and a local committee went over the proposed route for the railroad through the Nippenose Valley near Williamsport, Pa., last week. The start was made at Jersey Shore Station and the route followed was to Millport, Collomsville, and thence eastward along the Mosquito River to Williamsport. The grade from Jersey Shore to Collomsville was reported to be about 42 ft. to the mile, but east of Collomsville the road would have to go over a summit about 690 ft. above the town, after which the route is again along a level course.

Proceedings of the property of Southeyn. The component has

ft. above the town, after which the route is again along a level course.

Pearla, Princeton & Southern.—This company has been incorporated in Arkansas to build a railroad from Pearla, Hot Springs County, east to the Wyandotte & Southeastern, then south through Hot Springs, Dallas and Ouachita Counties to Bearden, Ouachita County, about 50 miles. The road will open up a fine timber and mineral section. The incorporators are: Adelbert Strauss, St. Louis; Max A. Nulson, Malvern, Ark.; Waldrauer Strauss, Fordyce, Ark.; William A. Read, Malvern; George W. Taussig, St. Louis.

Pennsylvania Midland.—This railroad, which is to extend between Cessna, on the Bedford Division of the Pennsylvania Railroad, and Brook's Mills, Pa., on the Altoona Division, is nearing completion and will be in operation in a short time. The road will be about 25 miles long. The roadbed is completed and the rails are now being laid. It will be operated as an independent line, when finished. The grading is being done by E. A. Tennis, the contractor who built the South Jersey. The road will open up an undeveloped region, which is rich in mineral and lumber resources. It is controlled by Theo. Gerrish and others, of Maine, who are also interested in other short roads in Pennsylvania, and who own property along the route of the new road. They secured early in the year the franchises of a company which had done some grading out of Bedford some few years ago. Work has since been prosecuted until now the road is nearly ready to be opened. G. B. Orlady, of Huntingdon, Pa., is President, and J. Murray Africa is Chief Engineer.

Pomona, Salian & Southern.—A company of this name was chartered in Missouri last week. The incor-

Pomona, Salian & Southern.—A company of this name was chartered in Missouri last week. The incorporators are J. E. Kreybill, W J. Kreybill, William Pitts and H. D. Mackey of Howell County. The object is the construction of 10 miles of railroad in Howell County, between Pomona and Salian Springs.

Reading & Southwestern.—Work is progressing rapidly on the Mohnsville & Adamstown branch. Train have been running for some time as far as Gouglersville Pa., and the tracks have been laid about five miles beyon that point. Adamstown will be reached in a few weeks.

have been running for some time as far as Gouglersville, Pa., and the tracks have been laid about five miles beyond that point. Adamstown will be reached in a few weeks.

Southern Pacific.—This road is acquiring right of way and has made applications for fianchises to gain an entrance into the City of Pasadena, Cal. About seven miles of new track will be constructed, thus bringing this new line into connection with the main line at the town of Shorb. The construction of this line is required by the policy which the Southern Pacific has put forth, which is, to gain an entrance into each important city of Southern California. Only two important cities now remain, to which it has not yet completed its connection; viz., Riverside and San Diego.

St. Louis, Collinsville & Eastern.—The grading on this new coal road between East St. Louis and Collinsville, Ill., is being pushed rapidly, several miles having been completed during the last month. A large force of men and teams, with grading machines, are on the work and it is expected that the grading will be finished before cold weather. The road will be a direct route from East St. Louis to the heavy coal fields near Collinsville, and will compete with the Vandalia line between these towns. J. S. P. Gordon is President of the road.

St. Croix Penobscot.—The survey for the extension of this road from Princeton, Me., north to the Maine Central, is now being made. Other surveys have been made from time to time with the same object in view. The project has now been taken up by G. P. Westcott and James Mitchell, who have done considerable construction work in Maine, with better chances of being carried out.

Tennessee Central.—The contract for building the 25 miles of the railroad between Rockwood and Montercy, Tenn., has been let to Underwood & Green, of Chicago. One of the stipulations of the contract is said to be that the contractors are to sub-lease 600 convicts from the Tennessee Coal & Iron Railway Co.

Unadilla Valley.—General Manager F. F. Culver has recently retu

Tennessee Coal & Iron Railway Co.

Unadilla Valley.—General Manager F. F. Culver has recently returned to New York, after a tour of inspection of the new road. The track he reports as now laid as far as Sweet's, a point 12 miles distant from Bridgewater, the northern terminus. It is expected that the road will be completed as far as South Edmeston before winter. That will bring it within four miles of New Berlin, the terminus of the line, where a connection is made with the New York, Ontario & Western.

the New York, Ontarió & Western.

United States Coal, Iron & Manufacturing Co.—
The railroad to be built by this company in West Virginia, and briefly referred to last week, has been surveyed and the work is now ready for grading. The construction will probably be undertaken by the company and not let to contractors. The line will be about 12 miles long from Belington, the headquarters of the company, along the Tygart River to Monroe in Randolph County, W. Va. The connection to be made, as already stated, is with the West Virginia, Central & Pittsburgh and the new Roaring Creek & Charleston Railroad. W. L. Watrons, of Waverly, N. Y., is President, and F. P. Rease, of Belington, is General Manager.

ington, is General Manager.

West Virginia Central & Pittsburg.—The engineers who were at work on the southern extension line on Craven's Run, have completed their work in that section, and have begun on the survey of a line from Shavers' Fork to Gladys Fork of Cheat River, across the country. The line is an experimental one, no work in the direction of making a location having been made. It is proposed to strike the Gladys Fork at Cheat Bridge, and the present survey is to discover if such a line is practicable. The route passes through some fine coal and timber lands in

the upper part of West Virginia, and the consideration of it is in connection with the development of these

Winnipeg & Hudson Bay.—A large deputation has been waiting on the Dominion Government, at Ottawa, asking further assistance towards the construction of this road. They ask that the Government advance a loan of \$4,200,000, or \$6,000 a mile, and take a first mortgage bond on their land grants of some 6,000,000 acres.

\$4,200,000, or \$6,000 a mile, and take a first mortgage bond on their land grants of some 6,000,000 acres.

Wiscasset & Quebec.—The work of laying the track on this railroad is going along steadily. About 12 miles of rails have been laid to the town of Whitefield. The new freight cars for the road are being received from the Portland Company.

Woodstock & Centreville.—It is reported that the charter for this railroad in New Brunswick has been transferred to English capitalists, who become bound to have a survey made this fall to begin active work in April, and to have the road completed with round-house and repair shop at Woodstock, and a station-house and repair shop at Woodstock, and a station-house at Centreville and Woodstock, in November next.

Yarmouth.—This company is now applying for incorporation in Nova Scotia to build a standard-gage road in Chebogue, Little River, Tusket Wedge, Carleton and Kempt counties. The necessary legislative powers are now being applied for by E. Franklin Clements. The rout described in the plans extends in a southerly direction from the harbor of Yarmouth to Chebogue and Rockville. Chebogue River will be crossed by a drawbridge to Clement's. The road then crosses Little River and marshes to the granite quarries, crossing the Goose Bay embankment to a deep water terminus at Tusket Wedge. Thence through Plymouth on a level grade to a point on the South Shore Railway near Salmon River, and to Tusket Falls and the farming, lumbering and mining districts of Deerfield, Carleton and Kempt.

#### GENERAL RAILROAD NEWS.

Atchison, Topeka & Santa Fe.—Judge J. C. Foster of the United States District Court, at Topeka, has rendered his decision in the stockholder's injunction case in favor of the defendants, the majority stockholders thereby securing a victory over the Stockholders' Protective Committee. The injunction asked for to restrain the defendants from electing a Board of Directors except by the cumulative system of voting was denied. The stockholders this afternoon reëlected the old Board of Directors with two exceptions. P. I. Bonebrake of Topeka, was elected in place of I. Severy of Emporia, and E. Wilder, Treasurer of the company, in place of Alden Speare, of New York.

Canadian Pacific.—The earnings reported in the following table are the latest that have been published:

CANADIAN PACIFIC.

Month September. 1894.  Gross earn\$1,776,053  Oper. expen	1893, \$1,918,324 1,116,488	Dec. \$142,271 13,641
Net earn	801,836	128,630
Gross earn	15,115,215 9,818,436	2,028,232 740,414
Net earn\$4,008,961	\$5,296,779	\$1,287,818

Charleston, Sumter & Northern.—This railroad, connecting with the South Carolina & Georgia Railroad at Pregnalls, S. C., and extending to Hamlet, N. C., has been bought by the Atlantic Coast Line, which has assumed control. No change in the passenger service of this through line has yet been announced. The policy in the purchase of this line seems to be that of control of a parallel road, but there is an impression abroad that this purchase only precedes the purchase of the South Carolina & Georgia line, an agreement having been reached, it is said, between the Atlantic Coast Line for a joint traffic management with the Louisville & Nashville system, which system now owns the terminal properties of the South Carolina. The Coast Line is now running its passenger trains into Augusta, Ga., from Denmark, over the South Carolina & Georgia, a distance of about 50 miles.

\*\*Chicago\*\*, Burlington & Quincy.\*\*—The earnings for September and the year to Sept. 30, are given in the Month Santenber.

following table: Month September. Gross earn		1893. \$3,520,194 1,946,544	Dec. \$690,349 341,602
Net earn Fixed charges Surplus Jan. 1 to Sept. 30.	800,000	1,573,650 822,881 750,769	348,747 22,881 325,866
Gross earn	23,380,723 14668,299	\$28,521,973 19,079,758	\$5,141,250 4,411,459
Net earn Fixed charges Surplus.  Central of New Jersey are given in the following		9,442,215 7,405,928 2,036,287 arnings for S	729,79 205,92 523,86 September
the street in the tonowing	1894.	1893,	Dec.

Oper expen	694,249	40,332
Net earn\$373,089	\$520,541	\$147,452
Cleveland, Cincinnati, Chicago	& St. Lou	isThe

earnings are reported for September and the three

months:	1894.	1893.	Inc.	or dec.
Gross earn	\$1,205,677	\$1,237,761	D	\$32,084
Oper, expen, and taxes	857,158	902,612	D	45,454
Per cent	71.09	72.92		
Net earn	348,519	335,149	I	13,370
Charges	238,628	229,750	I	8,878
Surplus	109,891	105,399	1	4,492
Three months ending Sept. :	30:			
Gross earn	3,343,316	3,650,155	D	306,839
Oper, expen, and taxes	2,562,483	2,767,765	D	205,282
Per cent	76.64	75.82		
Net earn	780,833	882,390	D	101,557
Surplus	75,880	210,054	D	134,174
Wild - b b	1	41	30.00	C3 D-

Fitchburg.—The formal opening of the Milford & Bookline branch of this road for traffic occurred on Nov. 5. This road is seven miles long and extends the branch roads by the Fitchburg Railroad from near Ayer, Mass., across the Massachusetts State Line to Brookline, N. H., built in 1892, north to Milford, N. H., on the Boston & Maine Railroad west of Nashua.

Jacksonville. Louisville & St Louis.—This company has entered into a contract with the Louisville & Nashville for the joint use of the latter company's main track between Drivers and Mt. Vernon, Ill., and its station facilities at Mt. Vernon. Beginning Nov. 5 the passenger and freight trains of the Jacksonville, Louisville & St. Louis Railroad will run to and from Mt. Vernon, Ill.

Kingston & Pembroke.-Proceedings were lately

taken by the bondholders of the company to enforce pay ment of interest due on their bonds. Judgment has beer pronounced and the appointment confirmed of Joseph Bawden, of Kingston, Ont., as Receiver of the road. It is 104 miles long, from Kingston to Renfrew, Ont.

New York Central & Hudson River.—The ings are reported in the following table for the months ending Sept. 30, as follows:

Gross earn\$1	1894,	1893. \$12,211,847	In	c. or Dec. \$1,371,025
Oper. expen		8,268,089	Ď	1,153,330
	3,726,063 2,630.152	3,943,758 2,629,848	D	217,695 303
Profits	1,095,911 1,192,853	\$1,313,910 1,117,854	$_{\mathbf{I}}^{\mathbf{D}}$	217,998 75,000
Deficit	\$96,942	\$196,056	D	\$292,998

Operating expenses were 65.63 per cent. of gross earnings, against 67.71 for the corresponding period of last year, and the amount earned upon the stock was 1.15, against 1.47 last year. The gross earnings of the system for September were \$3,788.351, a decrease as compared with the same month of last year of \$433,353. The system now consists of 2,396½ miles, an increase of 62½ miles over last year.

of 2,396½ miles, an increase of 62½ miles over last year.

New York & New England.—The Reorganization Committee expects the foreclosure under the second mortgage to take place early in December. It may take steps before that time which will enable the Receivers to secure needed new equipment.

Northern Pacific.—The Receivers, through the Chairmen of their Finance Committee, Mr. Rouse, have negotiated the sale of \$3,500,000 Receivers' certificates to the General Reorganization Committee, represented by Mr. Edward D. Adams, Chairman. This insured the retirement on Nov. 1 of the certificates, which were taken up on Oct. 1 by Brayton Ives. The receivers announce that payment will be made of the interest maturing Jan. 1, 1895, on the \$43,993,000 first mortgage bonds. This negotiation was closed after Judge Jenkins had rejected as inadequate the bids for the certificates filed at Milwaukee.

Judge Jenkins has consented to the substitution of

ficates filed at Milwaukee.

Judge Jenkins has consented to the substitution of Messrs. Payne, Rouse, and Oakes, receivers of the Northern Pacific, for the separate receivers of the 22 branch lines, thereby saving about \$50,000 a year in salaries.

Northwestern North Carolina.—The question of the appointment of a receiver for the Northwestern North Carolina Railroad (which is a portion of the Southern Railway system, extending from Greensboro, N. C., to Wilkesboro, N. C., about 150 miles) was argued before Superior Court Judge Hoke, at Hillsboro, N. C., last week, and the application was denied.

Sebasticook & Mooschead.—President Van Wart.

Sebasticook & Moosehead.—President Van Wart, of this 8-mile railroad, in Maine, has sold the controlling interest in the property to Z. D. Lancaster, of

Sioux City & Northern.—Judge Shiras, in the Federal Court at Sioux City, has made an order fixing Nov. 25 for hearing the arguments on the question of ownership of the stock and bonds of the Sioux City & Northern and Sioux City, O'Neil & Western roads. The securities are claimed by J. Kennedy Tod & Co., of New York and the Credits Commutation Co. The amount involved is about \$4,000,000.

claimed by J. Kennedy Tod & Co., of New York and the Credits Commutation Co. The amount involved is about \$4,000,000.

South Jersey—The committee representing the bondholders and creditors have decided to apply to the court asking for authority to issue receivers' certificates amounting to \$50,000. This plan was recommended by Receiver Francis I. Gowen, who estimates that this issue will give him sufficient funds to adjust the most pressing debts, including the overdue wages account which goes back to June. The amount of bonds outstanding is given at \$850,000, for which, however, only \$90,000 are in the hands of owners, the remaining \$760,000 being pledged as collateral for loans to the company. The unsecured indebtedness is over \$150,000. During the winter months the income of the company will be very small and extensive repairs will also be necessary to the loadbed.

Valley (Ohio).—A reorganization committee composed of Myron T. Herrick, chairman, and others of Cleveland, O., E. Connor, of New York, and Henry N. Paul, Sr., of Philadelphia, gives notice that a plan and agreement for the reorganization of the company has been made by them in the interests of the holders of the first mortgage bonds and the consolidated, or second mortgage, bonds of the company. There are unpaid coupons of the first mortgage bonds, which have been in existence for over ten years, amounting to \$222,460, and two years' accumulated interest. This, with car trust contracts, accounts payable, receivers' certificates, etc., makes a total of \$1,423,509 to be provided in addition to the \$2,176,000 paid to the holders of the first mortgage bonds, making a total of \$3,599,509 first mortgage bonds to be used for the purpose of having a working railroad company. The Drexel estate, which owns \$309,000 of the second mortgage bonds and \$50,000 of the first, has deposited its bonds in favor of the present Reorganization Committee.

Washington & Chesapeake.—This company has confessed judgment in the United States Circuit Court at

Drexel estate, which owns \$309,000 of the second mortgage bonds and \$50,000 of the first, has deposited its bonds in favor of the present Reorganization Committee.

Washington & Chesapeake,—This company has confessed judgment in the United States Circuit Court at Washington, D. C., in favor of J. Kennedy Tod & Co., of New York. The judgment is upon a loan for \$40,000, negotiated in April, 1894. Tod & Co. accepting as collateral six notes of \$10,000, authorized to be issued by the railway company, through Vice-President Henry C. Speer. The loan was negotiated to pay construction expenses.

W. J. Taylor, of Baltimore, has been made Receiver of the railroad, with the consent of the railroad officers. Mr. Taylor is the receiver of the firm of Coffin, Sullivan & Co., of New York, the railroad contractors to whom the contract to build the railroad from Washington to Chesapeake Beach was let. The appointment was made, on a bill of complaint filed by Mr. Taylor, alleging an indebtedness of \$52,000 of the company to the contractors. More than half the grading on the road, which is to be about 30 miles long, was completed by the contractors when they suspended operations in July last. The company was incorporated in 1892, to build the railroad and to develop property at Chesapeake Bay. The plans included the building of two hotels, cottages and so on, for a summer resort. When the contract was let to Coffin, Sullivan & Co., the President was J. C. New, formerly United States Treasurer, and the Vice-President was H. C. Spear, a banker of Chicago. Both of these officers have recently resigned.

Winona & Western.—This company has been organized to operate the Winona & Southwestern Railroad, recently sold at foreclosure. The capital stock of the new company is \$2,000,000. The incorporators are H. W. Lamberton, M. Norton, V. Simpson, R. D. Cone, E. S. Youmans, all of Winona, who were connected with the old company. The road extends from Winona to Osage, Ia., just south of the state line, the total length of the

#### TRAFFIC.

Chicago Traffic Matters.
CHICAGO, Nov. 7, 1894,
All rail shipments eastbound last week were slightly below the tonnage for the preceding week while lake shipments show a gain. Grain shipments were comparatively light, the bulk of the lake tonnage being ore from Lake Superior ports.

Eastbound rates continue in a bad way. Dressed beef and provision rates are being cut by nearly all the lines, and there is considerable doubt as to whether a restoration will be effected on Nov. 12 as proposed. All the Eastern lines have voted to advance the grain rate to 25 cents, Chicago to New York, on that date and also to "restore" the provision rate, which is an admission that the latter is being manipulated. In fact, there is little doubt that cuts of from 10 to 12 cents per 100 lbs. are being made in the provision rates. The advance ordered on grain is from 20 to 25 cents per 100, New York basis. Grain shippers are inclined to make merry over the improbability of any maintained advance and at the same time are protesting against it on account of the small offerings and dull markets. It is probable, also, that a postponement may be rendered necessary until the close of navigation, caused by the refusal of the Lake Superior lake and rail lines to join in the advance from St. Paul to Duluth.

Shippers of live hogs and packing house products from

offerings and dull markets. It is probable, also, that a postponement may be rendered necessary until the close of navigation, caused by the refusal of the Lake Superior lake and rail lines to join in the advance from St. Paul to Duluth.

Shippers of live hogs and packing house products from the Missouri River are protesting against the proposed advance voted by the Western lines, but it is probable that it will go into effect.

The Eastern lines have voted to extend the order recently made again absorbing the \$2 switching charge on packing house products from the Union Stock Yards, making it apply to Hammond and other packing centers outside the Yards.

Western roads continue firm in their determination not to recede from the position they have taken in the switching charge matter. Suit was commenced by W. T. Keenan and other cattle commission men in the United States Federal Court on Nov. 3 against the Atchison, to compet that road to accept certain cars of live stock now standing on the tracks here, without the exaction of the switching charge, the ground claimed for the action being a Supreme Court decision requiring the roads to furnish unloading facilities for live stock. The suit is in the nature of a test case, the Atchison being selected because it is in the hands of the court and suit can be brought in the United States Court. The attorneys for the road filed their answer yesterday, in which they claim that they are not responsible for the exaction of the switching charge, which is forced upon them by the charges of the Union Stock Yards Co.

The real complaint of the cattlemen is not so much the charge of \$2 as that a similar charge is not made at Kanass City, St. Louis, Omaha and other packing points, thus, as they claim, discriminating against the Chicago buyers.

The Western lines are apparently determined to fight the Canadian Pacific to a finish in the ticket commission matter. Assurances having been received from the New York Central that it will join the other Trunk Lines in coöperating with t

York.
The Chicsgo Great Western has joined the other Western lines in the agreement recently adopted at St. Louis for a division of tonnage.

The shipments of eastbound freight, not including live stock from Chicago, by all the lines for the week ending Nov. 3, amounted to 46,476 tons, against 47,526 tons during the preceding week, a decrease of 1,050 tons, and against 57,855 tons for the corresponding week last year. The proportions carried by each road were:

ROADS.	WEEK TO NOV, 3		WEEK то Ост. 27.	
	Tons.	р. с.	Tons.	р. с.
Michigan Central	2,388	5.1	3,191	6.7
Wabash Lake Shore & Mich. South	4,208 4,364	9.0	5,340 4,048	11.2 8.5
Pitts., Ft. Wayne & Chicago.	5,934	12.6	5,506	11.6
Pitts., Cin., Chi. & St. Louis	8,922	19.2	7,873	16.6
Baltimore & Ohio	3,518	7.6	3,376	7.1
Chicago & Grand Trunk	3,829	8.2	3,707	7.8
New York, Chic. & St. Louis	5,915	12.6	7,044	14.8
Chicago & Erie	5,562	12.1	5,056	10.6
C., C. C. & St. Louis	1,956	4.2	2,385	5.1
Totals	46,476	100.0	47,526	100.0

Of the above shipments 1,525 tons were flour, 12,815 tons grain and mill stuff, 10,263 tons cured meats. 10,184 tons dressed beef, 1,294 tons butter, 1,874 tons hides, and 5,740 tons lumber. The three Vanderbilt lines carried 29.1 per cent, the two Pennsylvania lines 31.8 per cent. Lake lines carried 46,494 tons against 44,322 tons last week.

Dress Beef Shippers Lose Their Big Suit.

Judge Grosscup has rendered a decision in the United States Court at Chicago, against the "Big Four" packers—Swift, Armour, Morris and Hammond—and in favor of the railroads against whom suit was brought to recover money said to be due the packers, as paid out by them in excessive rates-on meat sent east from Chicago. Twelve trunk line were sued. Judge Grosscup holds that the packers could not recover, in the absence of a common law of the United States, as well as the silence of the State statutes regarding such cases. This decision was filed some time ago, but Swift & Co. filed a number of special counts. These constituted the case now passepupon.